

Railway Age Gazette

PUBLISHED EVERY FRIDAY AND DAILY EIGHT TIMES IN JUNE BY THE
SIMMONS-BOARDMAN PUBLISHING COMPANY
WOOLWORTH BUILDING, NEW YORK.

CHICAGO: Transportation Bldg. CLEVELAND: Citizens' Bldg.
LONDON: Queen Anne's Chambers, Westminster.

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Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00
Canada.....	6.00
Foreign Countries (excepting daily editions).....	8.00
Single Copies.....	15 cents each

Engineering and Maintenance of Way Edition and four Maintenance of Way Convention daily issues, North America, \$1; foreign, \$2.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

WE GUARANTEE that of this issue 8,600 copies were printed; that of these 8,600 copies 7,381 were mailed to regular paid subscribers to the weekly edition, 184 were provided for counter and news companies' sales, 972 were mailed to advertisers, exchanges and correspondents, and 63 were provided for new subscribers, samples, copies lost in the mail and office use; that the total copies printed this year to date were 340,450, an average of 9,201 copies a week.

THE RAILWAY AGE GAZETTE and all other Simmons-Boardman publications are members of the Audit Bureau of Circulations.

VOLUME 59

SEPTEMBER 10, 1915

No. 11

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GENERAL NEWS SECTION

* Illustrated.

Is it not true that the greater proportion of engine failures in the last analysis are "men" failures, due to poor judgment and lack of knowledge? This condition in turn may be charged to poor and inadequate supervision. To remedy it each failure must be carefully and thoroughly investigated. One great trouble on some roads is that the officers in charge are satisfied with superficial investigations and reports. These are useless and often result in having one branch of the service or department unjustly pass the blame to another, with resulting friction and waste of energy; meanwhile the real cause of a failure is overlooked and similar failures

Responsibility for Engine Failures

may continue to take place with more or less frequency. Conditions of this kind require an iron hand and can best be handled by a committee or board of responsible officers, selected from the different departments interested, which will insist on such thorough and complete reports of each failure as to enable the blame to be properly placed. This board should also be charged with the responsibility of seeing that defects in either equipment or organization are remedied and that abuses are removed.

Make the Service More Attractive

D. C. Buell, director of the Railway Educational Bureau, makes several suggestions in a letter on another page which demand consideration from those who are interested in the necessity of giving more attention to training railway employees. To attract and hold desirable young men the work should be made as attractive as possible and means provided by which those who are ambitious to fit themselves for promotion may do so. This does not mean that the work should be made easier or the responsibilities lightened. Hard work and responsibility have an attraction for live, wide-awake young men if they can see that their efforts count and are appreciated. Nothing is more disheartening than to grind along with the feeling that their work is unimportant or that their efforts are being overlooked and that there is little opportunity for advancement; and yet, considering the general atmosphere and conditions in many railroad offices, it is not surprising that this feeling should prevail. Railroad work, because of its very nature, has a fascination for most young men and it should not be difficult to make the service still more attractive by developing a comprehensive scheme for training the young men to increase their knowledge and efficiency and helping them to fit themselves for more important positions and greater responsibilities.

The address on "Train Despatchers and Division Officials," presented by J. P. Finan at the convention of the superintendents' association and published in the issue of August 27, page 380, calls attention to a situation with reference to the treatment and status of the train despatcher that has rankled in the minds of the despatchers

The Status of the Train Despatcher

for a long time and has caused considerable agitation in the conventions of the Train Despatchers' Association for several years, without having attracted much notice elsewhere. In brief, Mr. Finan urges a better recognition on the part of division officers of the difference that exists, or should exist, in the relations between the company and the despatchers and other employees, and of the fact that the despatchers' relation to the company is, or should be, just a little broader than that comprehended by the word "employee." He shows that, rightly or wrongly, there exists in the minds of a great many despatchers a feeling that their superior officers consider, or at least treat them, no differently from what they do the employees who are affiliated with organizations that demand from their members a loyalty paramount to the loyalty they owe the company, and that possibly their condition might be improved by the formation of a "protective association" like others that have been able to force concessions from the railways. The Train Despatchers' Association has never been such an organization. Its aims and functions have been the same as those of other organizations of railway officers, being directed toward the increase of efficiency in the work of its members. However, only the most heroic efforts on the part of its officers have prevented turning it into a "protective organization," in other words, a labor union. Even now there is a strong movement on foot to affiliate the train despatchers with one of the great labor brotherhoods, and it is understood that many of the despatchers are in a receptive mood. As Mr. Finan says, there should be no more reason for a protective organization of despatchers than of superintendents, and the idea of the despatchers owing allegiance first to a union, and second to the railway, is almost unthinkable. It is gen-

erally recognized that railway officers and other employers in the past have been to a large extent responsible for the present strength of the labor unions, and it would be unfortunate if their treatment of the despatchers should lead to the formation of another labor union affecting so vital a branch of railway operation.

"Why do you suffer our ignorance, which so fatally injures your business?" This frank, forceful question tersely sums up "A

Inefficiency in Railroad Offices

Clerk's Plea," which appears in another part of this issue, and which should be carefully studied by every railway officer who is interested in cutting out waste and inefficiency in office work—and this means

the entire service, for men engaged in the actual work of carrying on transportation and looking after maintenance may be, and often are, seriously handicapped and discouraged in their efforts by inefficiency and lack of team work on the part of the office forces. The "clerk's plea" is an indictment of the thoughtlessness of the railroads in overlooking the vital necessity of providing for the proper instruction and training of the office forces. Agitation of this question, which is now going on, would indicate that many railway officers are awakening to the seriousness of the situation. The problem will be half solved if railway executives generally will recognize the necessity of taking steps to solve it and will concentrate their energies on improving the conditions which now exist. It is true that the criticisms made in the article may not apply to all roads, but the indications are that such conditions exist to a greater or less degree on most of them.

THE LICENSING OF ENGINEERS

ALTHOUGH the licensing of engineers has been the subject of much discussion among the technical associations for several years, Illinois is the first state which has actually passed a law providing for this. Prompted by dissatisfaction on the part of consulting structural engineers with the broad provisions of the existing state architects' law, a committee of the Western Society of Engineers procured the enactment at the last session of the state legislature of a similar law governing the licensing of structural engineers. Briefly, this law requires that any person engaged in designing or supervising the construction, enlargement or alteration of any structures other than buildings, shall have a license or be under the employ of a licensed engineer. The act defines structures as including coaling stations, elevators, docks, bridges, reservoirs, shops, roundhouses, power houses, etc. Provision is made for the licensing of any person now practising structural engineering in Illinois without examination upon the payment of a fee of \$50. No arrangement is made, however, for the licensing of non-resident engineers without examination regardless of professional standing or experience.

Thus, the chief engineers and bridge engineers of railroads with headquarters outside the state must pass an examination before the state examining board or arrange for some subordinate, resident in the state, to take out such a license and do work in the state over the latter's signature. Likewise, a consulting engineer or a manufacturer located without the state and engaged in the design and erection of structures coming within the limits of this law must pass an examination before he can compete on an equality with resident engineers. While the law contains a reciprocal provision authorizing the granting of licenses to engineers of other states in which similar laws are in effect, since Illinois is the only state which has passed such a law, this measure is of no consequence. Carried to its logical conclusion, the engineering executive of a railroad will be required to procure a license from every state through which the road passes and the expense, whether borne by the individual or by the road, will be considerable.

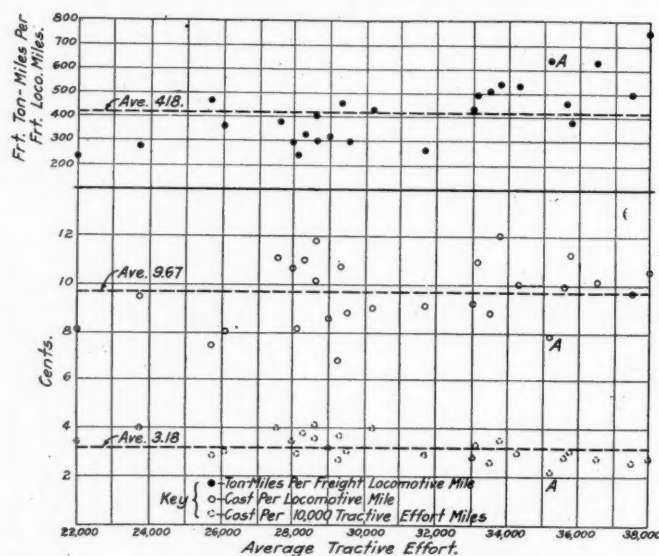
Even more serious is the confusion resulting from a variety

of laws with different provisions and requirements which may be expected if this movement becomes general. Thus, to improve a purely local situation, with only a secondary desire to improve the safety of design, this restrictive measure has been enacted. The licensing of engineers has never been favored by the majority of the engineers themselves, and it is not expected that this measure will meet with any greater degree of approval.

LOCOMOTIVE MAINTENANCE

IN order to secure a comprehensive idea of what the large capacity locomotives have done toward reducing the operating expenses of the railroads of this country, data taken from the 1913 report of the Interstate Commerce Commission is plotted on the accompanying chart. Twenty-seven representative roads whose locomotive repairs amounted to over a million dollars each were considered, and the cost of locomotive repairs per locomotive mile and per 10,000 tractive effort miles, and the freight ton-miles per freight locomotive mile were computed for each road. These results were plotted according to the average tractive effort of all the locomotives on the respective roads.

The upper set of points shows how those roads that have increased the capacity of their freight locomotives have been able to increase the ton-miles per locomotive mile; the middle set of points shows that the cost of locomotive maintenance per locomotive mile increased with the heavier engines, and the lower set of points shows that even though there was an increase in the cost of maintenance per locomotive mile there was, in reality, a decrease in the cost of locomotive maintenance if the hauling capacity of the locomotives is considered—that is, the cost of locomotive maintenance per 10,000 tractive effort miles was less for those roads having locomotives of the higher average tractive effort than for those roads having the lesser. While it would have been desirable to compare the cost of locomotive maintenance with the



ton-miles, it was impossible to do this as the statistics presented in the Interstate Commerce Commission's report do not differentiate between the cost of repairs for passenger and freight locomotives. However, by referring to the top and bottom set of points a clear conception of what is being accomplished may readily be obtained.

Although there is considerable variation among the "ton-miles per locomotive mile" set of points, it does not necessarily mean that all the roads that are low in their performance are inefficient, for the operating conditions will, to a large extent, affect this figure. The road which appears to have the best record in all these sets of points is marked with the letter A. This road is a low grade line and has a large amount of through business, its main line being over 500 miles long. The usual "cost per locomotive mile" basis of figuring the cost of locomotive maintenance

does not reflect the actual conditions, as does the cost per 10,000 tractive effort miles. The former shows an increase in maintenance cost for the larger locomotives, where there is in reality a decrease from the standpoint of the total work the locomotives are capable of doing.

The chart shows that the higher capacity locomotives are relatively cheaper to maintain and that they are being used, in most cases, to good advantage, but it should not be understood that the larger locomotives will be suitable in all cases. Heavy power has a big field of usefulness, but the traffic conditions must warrant it. Three large roads of the West and Southwest having locomotive maintenance costs much in excess of those shown above, according to both bases, have been omitted for the reason that their conditions are so different from the average road.

WHILE OTHER ACCIDENTS DECLINE TRESPASSING ACCIDENTS STILL INCREASE

RAILWAY travel has not for many years been especially hazardous and it is becoming safer every year. Working on a railroad, while properly classed as a more or less dangerous occupation, according to what department an employee is in, is also each year attended with a reduced degree of risk. But trespassing on railway tracks and trains has always been and still continues to be a very unsafe occupation, and is not growing less so.

While regulating bodies of all kinds have been very busy passing laws and issuing orders to prevent railway accidents, the railways themselves have exerted the most strenuous efforts to remove one of the most serious blots on their record, with the result that fatalities to passengers as well as to employees have been steadily decreasing. To the most numerous class of railway casualties, however, the fatalities to trespassers, the same bodies that have been most vigorous in regulating the railways have shown indifference; and this in spite of the fact that the number of people killed while unlawfully using the railroad tracks as a short cut or stealing rides on cars and engines, has continued to grow from year to year.

E. W. Camp, attorney for California for the Atchison, Topeka & Santa Fe, in his address before the convention of the American Association of Railroad Superintendents at San Francisco, described some of the experiences of the roads in their recent futile efforts to interest the legislatures of the various states in a bill to make trespassing a misdemeanor. For example, he showed that in some states the bill could have been passed with a proviso that it should not apply to pickets during a strike!

It is interesting, therefore, to contrast the tendency shown by the kind of accidents for which the railways may be held responsible with the tendency of those for which no one is to blame but the victims themselves and the public and its representatives who refuse to lift a finger to stop the slaughter.

The number of railway casualties is so greatly affected by the volume of traffic and other factors that comparisons of individual years, or that fail to take such factors into consideration, are liable to result in very misleading conclusions, and it is far safer to compare periods of years. The statistics needful for such comparisons are available in the reports of the Interstate Commerce Commission for the years 1890 to 1914. For many years railway casualties increased very rapidly, mainly because the number of people exposed to railway accidents of all kinds, the mileage of railroads, the number of trains run and the volume of traffic handled, were increasing very rapidly. The fact that the increase in accidents was less than the increase in the chances of accident is frequently overlooked.

Comparing the last five-year period for which we have the figures, 1910 to 1914, with the period 1890 to 1894, the number of passengers killed increased 8 per cent, while the mileage of railroads increased 58.9 per cent and the number of passengers carried increased 86 per cent. The passengers carried one mile increased 153 per cent. The number of employees killed in the last five-year period was 30 per cent greater than in the first

period mentioned, but the number of employees was 114 per cent greater, and the tonnage of freight handled was 185 per cent greater, while the number of tons carried one mile was 225 per cent greater. These are the accidents with which railroading as a business is fairly chargeable. The number of trespassers killed during the last five years, however, was 52.6 per cent greater than during the period 1890-1894, the increase in fatalities to trespassers being twice as great in proportion as the increase in fatalities to employees and over seven times as great in proportion as the increase in passengers killed.

Such comparisons go back to the unregulated days of railroading. What are the facts for more recent years? Comparing the period of 1910-1914 with the preceding five-year period, 1905-1909, we find that the number of passengers killed was 19.3 per cent less in the latter period than in the former; and the number of employees killed was 4 per cent less, in spite of an increase in railroad mileage, in the number of employees and in the volume of both freight and passenger traffic. While there were these absolute decreases in the numbers of fatalities to passengers and employees, there was an absolute increase of 1.7 per cent in the number of trespassers killed.

If the improvement in respect to the safety of railway travel and employment be largely attributable, as some maintain, to regulation, to what must we attribute the continued increase in the number of fatalities to trespassers? As a matter of fact, the reduction in other accidents is mainly creditable to the managements of the railways, while the continued increase in fatalities to trespassers is mainly due to bad government. The railways have policed their tracks and arrested trespassers by thousands, only to see them turned loose because the judges have refused to convict them and because local communities have declined to stand the expense of their incarceration.

That the percentage of increase in fatalities to trespassers has not been larger is due rather to the activities of the railways in keeping up an agitation regarding the evils of trespassing than to any assistance they have received from legislatures, courts or commissions.

A few years ago C. C. McChord of the Interstate Commerce Commission called attention to the fact that from 1890 to 1909 a total of 86,733 trespassers had been killed on American railways. This represented 53 per cent of all railway fatalities. Since then many laws have been directed against the 47 per cent, but none against the 53 per cent. In the five years since 1909 the total fatalities to trespassers has been swelled to 113,480, an increase in five years of 26,747, and in 1914, 5,471 trespassers were killed. The percentage of trespassing fatalities to all railway fatalities is now slightly over 53 per cent.

In 18 years out of the last 25 more trespassers were killed than during the year before. In the five-year period, 1890-1894, the total was 17,523; from 1895-1899 it was 19,464, an increase of 11 per cent; from 1900-1904 it was 23,455, an increase of 20 per cent; from 1905-1909 it was 26,291, an increase of 12 per cent, and from 1910-1914 the increase was 1.7 per cent. While the railways have succeeded in reducing their own accidents in spite of the increase in mileage and traffic, the number of trespassers killed has almost invariably fluctuated with those factors. In other words, it has been governed almost entirely by the increase in the chances of accident. The more railroads there are and the more trains there are run the greater is the hazard that they will kill persons who insist in walking on the track, and apparently the more people there are in the United States the more trespassers there are.

The railway accident record is bad enough without being exaggerated. It has always been widely published and hence has received more than its proper share of attention as compared with the casualties in other industries. We sometimes read of an accident in which people have been "slaughtered like sheep." But the American railway accident record can never be properly understood nor adequately dealt with until some action is taken by the constituted authorities to separate the sheep from the goats and protect the goats from the consequences of their natural propensity.

Letters to the Editor

FACTOR OF ADHESION

ST. MARY'S, Pa.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The letter published in your issue of May 7, 1915, on the above subject, was written along the lines that appealed most forcibly to the writer at the time, without a thought of evading the direct issue on the question. To satisfy the criticism of Mr. Baxter, published on page 1463 of your issue of June 25 1915, he will endeavor to show why he does not believe in factors of adhesion higher than from 4 to 4.25.

The adhesion of a locomotive is the resistance which prevents or opposes the slipping of the driving wheels on the rails, and is due to the friction of the former on the latter. When we consider the process of starting a locomotive there is, at any instant, as we gradually apply the effort, an amount of friction called into play just sufficient to balance the effort; as the effort increases so does the friction, until it reaches a certain limiting value beyond which it cannot go. Any increase, then, causes the slipping of the driving wheels. Therefore, the logical conclusion is that the limiting friction should just balance or slightly exceed the tractive effort for the most economical condition of the rails. As the limiting friction is governed by the same laws as the friction of motion, with, however, a slightly greater co-efficient in most cases, it stands to reason that the factor of adhesion should be chosen from the analysis of the values obtained from these laws; the values of which can be easily demonstrated if one chooses to go to the trouble of making a few simple experiments. These values for the four most important rail conditions are nearly as follows:

On a dry sanded rail	3
On a dry rail	4
On a wet, sanded rail	5
On a wet or frosty rail	6

The most economical factor of adhesion is the one that will give the greatest earning power the year round at the least cost per pound of locomotive. There is no use in spending time on the factors 3 and 6, as we are all aware that they are unreasonable; the former because a locomotive could not carry enough sand to sand the rails every trip from start to finish, and even if this were possible, the cost of tires and rails would prohibit its use; the latter because we do not have wet or frosty rails the whole year round and the loss in tonnage is excessive. The advent of the trailing wheel types, such as the 4-4-2, 4-6-2 and 2-8-2 in late years is probably responsible for increasing the factor of adhesion to from 4.5 to 5 or over. These types were primarily developed to obtain boiler capacity, but it has been found that they are more slippery than the non-trailer types on grades with a factor of 4, consequently the wheel arrangement has possibly forced the increase in the factor of adhesion.

Now, let us decide upon a factor, say 4 or 5, by working out an example. Suppose we have two locomotives weighing 200,000 lb. on the driving wheels, one with a factor of 4 and the other with a factor of 5. The locomotive with the factor of 4 would have 50,000 lb. tractive effort, and the one with 5 would have 40,000 lb. Suppose that it requires 50 lb. per ton of locomotive and train to start on the controlling grade; then the two locomotives would handle 1,000 tons and 800 tons respectively, of locomotive and train, the one with the factor of 5 losing 25 per cent in tonnage. It is a well-known fact that a locomotive can handle considerably more tonnage after the train is in motion than it can start, consequently the locomotive is only valued for what tonnage it will start. Therefore, starting power, limited only by the dry-rail condition, is what is needed. It may be said that the locomotive with the factor of 4 cannot always handle the 1,000 tons. True, but the tonnage can be cut to suit the conditions and still it will usually handle more tonnage than the locomotive with the factor of 5. On the other hand the

locomotive with the factor of 5 cannot take advantage of dry rail conditions to the fullest extent because dry rail conditions will utilize a lower factor of adhesion than the locomotive can attain.

The conclusion is that the factor of adhesion should be slightly greater than the ratio between the limiting friction in pounds, and the weight on the driving wheels in pounds which, for the most economical rail conditions would be from 4 to 4.25.

As the writer is very much interested in Mr. Baxter's communication appearing in the issue of June 25, he would be pleased to see a further analysis by Mr. Baxter of the statements made therein to show why a high factor of adhesion is necessary.

E. F. GIVIN

Pittsburgh, Shawmut & Northern.

THE TRAINING OF RAILWAY EMPLOYEES

OMAHA, Neb.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The article "How to Select and Promote Your Men," written by Roy V. Wright, which appeared in your issue of August 6, is a very timely one.

I have been closely in touch with Deah Schneider's work and agree with him largely. While there no doubt is something in phrenology, character reading, etc., the fundamental truths underlying such a science as character reading—if it may be so spoken of—are not yet known, and, consequently, attempts to work out anything but very general results along these lines are as apt to fail as to succeed.

Railroad work is not as attractive to young men as it was ten years ago. One of the important problems today is to make the work more attractive to the younger generation so that there will be a better class of material to select from.

One who has had experience in trying to interest railroad men in increasing their efficiency by study and thus fitting themselves for promotion, finds that from this particular point of view railroad employees can be divided into several main classes:

There are those ambitious fellows who deny the right of seniority, so-called lack of "pull" or any other condition to stop them for a moment in their strenuous efforts to reach the top of the ladder.

Then, there is another class that sit back and say, "What's the use. You've got to have a pull; you can never get any further without it."

Still a third class is impressed with seniority promotions in the office. They plug along, impatiently waiting for the man ahead of them to die or get fired so that they will get another \$5 a month. There is an appalling number of such men in our railroad general offices today. They need to be reached to increase general office efficiency more perhaps than any other class of men.

Again, we have a considerable number of men who fail to realize the fundamental principles which their unions stand for and misuse their affiliation, depending on it to hold them in their jobs and get them the highest possible wages for the work, irrespective of its quality. The characteristic of this class of man is that he does not aspire to a higher position than a workman at his trade and depends upon his affiliation to hold him where he is. He is not going ahead, and, consequently, the procession is passing him.

Then there is another large number of railroad employees that are not affiliated with railroad organizations and that have not been intelligently handled by their immediate superiors. Promotions of this class of men have been more or less guesswork, and such guesswork promotion breeds inefficiency as is the case with those depending upon seniority.

Of all the educational work that is being done by railroads, either directly or through co-operation with outside educational institutions, the greatest success has been obtained where officers of the railroad have been sufficiently impressed with the educational work so that they have kept in touch with it closely, and have encouraged those who are ambitious enough to study by promoting them as their increased efficiency justifies and opportunity offers.

There is no doubt that a very important feature of railroad

work should be the intelligent selection and training of new men. It is also true that these men should be watched as outlined by Dean Schneider. Henry Ford has worked out a practical solution of the problem of transferring a man to work at which he will be successful rather than firing him because he does not make good at some certain job. A railroad with its many different lines of work should be able to do this.

On the other hand, the question arises as to whether the railroads give sufficient encouragement to the men in their employ who are ambitious and would be willing to increase their efficiency if they felt the effort would be appreciated.

At present railroad employees can obtain educational service at a nominal charge. With such service available to its employees, a railroad might well use the money, otherwise necessary to spend for a comprehensive scheme for the education of their men, on a department that would be responsible for the employment and proper placing of employees.

If it was understood that only those sufficiently ambitious to take time to study the literature of their business, as outlined in a recent editorial in the *Railway Age Gazette* entitled, "The Student in the Railway Business," could reasonably expect advancement, practically every man worth while would be anxious to become a student. Then the department responsible for the men could keep in touch with their studying on one hand and their practical work on the other, so that promotion would become more or less of an exact science instead of a hit-and-miss proposition, and something would be accomplished toward a solution of the problem at a cost ridiculously low compared to the results which it is possible to obtain.

D. C. BUELL

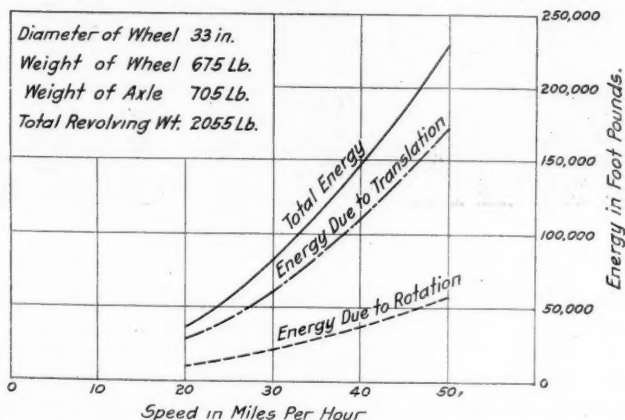
Director, Railway Educational Bureau.

ENERGY CONTAINED IN REVOLVING WHEELS AND LOCOMOTIVE SIDE RODS

CHICAGO, ILL.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Recently I had occasion to prepare some data on the energy contained in the revolving parts of locomotives and freight car wheels for different rates of speed, and as it may be of interest to your readers I am glad to submit it herewith. The diagram shows the energy contained in one pair of freight car wheels, including the axle, for speeds ranging from 20 to 50 m.p.h. Each wheel was 33 in. in diameter and weighed 675 lb.; the axle weighed 705 lb., making a total weight of 2,055 lb. To



Energy Contained in a Pair of Mounted Car Wheels at Different Speeds

obtain the total energy per car for all the revolving parts the results shown should be multiplied by four. In switching movements the average engine speed may be far below the minimum here shown, and the speed at which cars actually come in contact is below that of the engine used in accelerating them to speed. From the figures given, however, it should be clear that the destructive effect of impacts, or shocks, from switching, particularly to detached cars when brakes are not used to decelerate speed, is far in excess of the generally accepted estimates among railway men.

ENERGY CONTAINED IN MOUNTED DRIVING WHEELS OF DIFFERENT WEIGHTS AT VARIOUS SPEEDS

Road	Size of Locomotives Considered	Speed in M.P.H.				Foot Pounds of Contained Energy		
		M.P.H.	Rotation	Translation	Total			
A	Type 2-8-0	10	14,450	27,480	41,930			
	Weight.....175,000 lb.	20	57,430	110,810	168,240			
	Boiler pressure.....200 lb.	30	128,950	249,740	378,690			
	Cylinders....22 in. by 30 in.	40	237,560	442,990	680,550			
	Revolving unit wt...8,300 lb.	40						
B	Type 2-8-2	10	17,340	32,380	49,780			
	Weight.....218,900 lb.	20	69,360	130,570	199,930			
	Boiler pressure.....170 lb.	30	158,100	294,270	452,370			
	Cylinders....25 in. by 32 in.	40	279,480	521,970	801,450			
	Revolving unit wt...9,800 lb.	50	437,580	816,700	1,254,280			
C	Type 4-6-0	10	14,480	28,120	42,600			
	Weight.....143,000 lb.	20	58,960	113,390	172,350			
	Boiler pressure.....185 lb.	30	127,950	255,550	383,500			
	Cylinders....20 in. by 28 in.	40	237,240	453,290	690,530			
	Revolving unit wt...8,480 lb.	50	361,050	709,840	1,070,890			
D	Type 4-4-2	10	20,030	39,190	59,320			
	Weight.....105,000 lb.	20	88,100	158,060	246,170			
	Boiler pressure.....185 lb.	30	198,290	356,200	554,510			
	Cylinders....27 in. by 28 in.	40	284,580	631,860	916,440			
	Revolving unit wt...11,860 lb.	50	464,510	988,630	1,453,140			
E	Type 4-4-2	10	17,640	32,160	49,800			
	Weight.....105,400 lb.	20	72,320	129,700	202,020			
	Boiler pressure.....200 lb.	30	162,170	292,340	454,510			
	Cylinders....21 in. by 26 in.	40	289,300	518,530	807,830			
	Revolving unit wt...9,700 lb.	50	450,710	811,320	1,262,030			
F	Type 4-4-2	10	21,460	36,630	58,090			
	Weight.....93,000 lb.	20	84,630	147,750	232,380			
	Boiler pressure.....225 lb.	30	189,530	332,990	522,520			
	Cylinders....21 in. by 24 in.	40	336,140	550,650	886,790			
	Revolving unit wt...11,100 lb.	50	525,670	924,160	1,449,830			
		60	756,920	1,339,040	2,095,960			
		70	1,029,890	1,810,640	2,840,530			
		80	1,343,770	2,366,550	3,710,320			

The table gives the foot-pounds of energy contained in mounted driving wheels of six different locomotives at speeds varying from 10 to 80 m.p.h. The weight of each revolving unit in the table represents one pair of wheels mounted on an axle, plus the proportionate amount of side and main rod weight. This sum multiplied by the pairs of wheels would give the total weight of the revolving parts. In the last column of the table is given the total foot-pounds of energy contained in each revolving unit, due to both rotation and translation. Attention is called to the fact that in a freight engine (Road A) with small drivers, the total foot-pounds of energy at 40 m.p.h. in the revolving parts alone, is in excess of one-half million while the large passenger engine (Road F), with 84-in. drivers, at a speed of 80 m.p.h., the total foot-pounds of energy is in excess of three and one-half million and this, together with the many additional millions in the complete engine, must be absorbed by the brakes each time the engine is decelerated from the speeds shown to a state of rest.

A careful study of the foregoing cannot fail to lead one into profitable fields of investigation that hold much in store for those who have to do with the design, maintenance and operation of railway equipment, and through whose acts of omission or commission standards of efficiency are not as high as they should be. To those who advocate, or use, special brands of high-grade material in the revolving and reciprocating parts of engines, for the purpose of reducing weight and increasing the factor of safety of those parts, these figures serve as an unqualified endorsement and inversely offer a mild rebuke to those who have not recognized this potent factor in engine design. If the transportation men who handle freight cars will study the diagram in conjunction with the paper* on this subject presented at the last convention of the Master Car Builders' Association by Professor Endsley of the University of Pittsburgh, they cannot fail to see that by handling equipment carefully many millions of dollars may be saved to the carriers annually in the item of reduced cost of freight car maintenance, and many millions more in the items of personal injuries, damaged freight, and increased freight car mileage. The writer is indebted to the Baldwin Locomotive Works for weights of parts of locomotives from which these calculations were made.

W. E. SYMONS

* See *Daily Railway Age Gazette* of June 17, page 1391.

Important Realignment Problem on the Pennsylvania

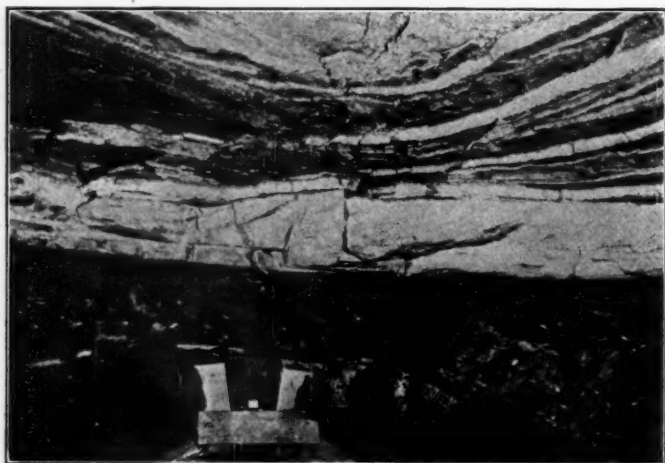
**Three Tunnels Will Eliminate 12.23 Miles of Line;
One Involved Unusual Difficulties with Falling Rock**

The Pennsylvania is completing some heavy realignment work on the Allegheny division, consisting almost entirely in the construction of three tunnels with a combined length of 8,703 ft., which will result in a saving of 12.23 miles. The portion of the Allegheny division, comprising that part of the system between the junction of the Allegheny and the Kiskiminetas rivers, 28.9 miles north of Pittsburgh, and the town of Oil City, Pa., is located on the left bank of the Allegheny river, which flows in a

average of 25 freight trains in each direction. It was concluded that this traffic justified the construction of tunnels at three points where the river makes wide detours around high bluffs, the topography lending itself to a relocation of the railroad, eliminating distance, and incidentally a considerable amount of curvature. The tunnel at East Brady is 2,468 ft. long and will result in a saving of 5.36 miles of line; the tunnel at Wood Hill is 2,730 ft. long, saving 3.4 miles of line; and that at Kennerdell is 3,505 ft. long, effecting a saving in distance of 3.47 miles.

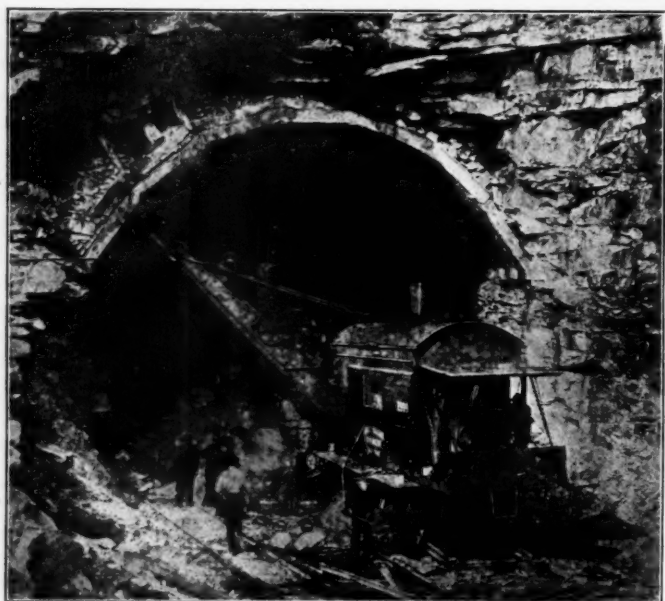
THE EAST BRADY TUNNEL

This article will deal entirely with the tunnel at East Brady, which is the shortest of the three, although it cuts off the most distance and eliminates 363.7 deg. of curvature. As shown in one of the illustrations, the situation is one that would naturally suggest a tunnel. In fact, a tunnel was considered at this location at the time that the line was built by the Allegheny Valley Railroad Company, but the idea was abandoned because of the pressure brought to bear by the Brady's Bend Iron Company, whose plant was located and operated on the opposite side of the river, near the middle of the loop, which the tunnel would



View of Roof After Rock Fall

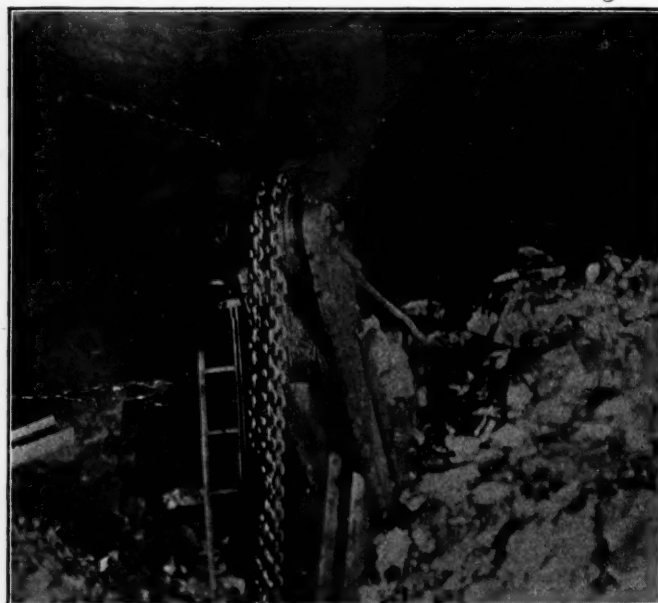
very winding and tortuous course between two ranges of bluffs varying from 100 to 700 ft. in height for practically the entire distance of about 102.8 miles. When the railroad was built, between 1855 and 1870, the demands for cheap construction resulted in a



Steam Shovel at Work at South Portal

location following the winding course of the river on a bench on the sides of the bluffs.

Since this line was acquired by the Pennsylvania the traffic has increased to such an extent as to justify double tracks from Pittsburgh to East Brady, a distance of 68.9 miles. The traffic at the present time consists of five passenger trains, and an



Shovel Buried Under a Fall of Rock

have eliminated. The project was kept alive, however, and surveys were made from time to time. In November, 1912, new surveys were made and in February, 1913, actual construction was commenced. The scheme originally authorized involved approach lines at each end of the tunnel considerably closer to the river than the original alinement. This was of advantage because it afforded a much better alinement through the tunnel and gave an economical and convenient location for the spoil from the tunnel excavation. In March, 1913, however, an extraordinary flood in the Allegheny river caused the Secretary of War to make provision for extensive revision of harbor line limits of that river, which precluded the construction of the realignment on the location originally intended. In consequence, it was necessary to bring the approaches closer to the bluffs, resulting in a sharpening of the curve at each end of the tunnel. The final alinement consisted of a 3-deg. 16-min. curve, 2,393 ft. long, through the central portion of the tunnel, with 4-deg.

curves on either end, that on the south being 439 ft. long and that on the north 560 ft. long.

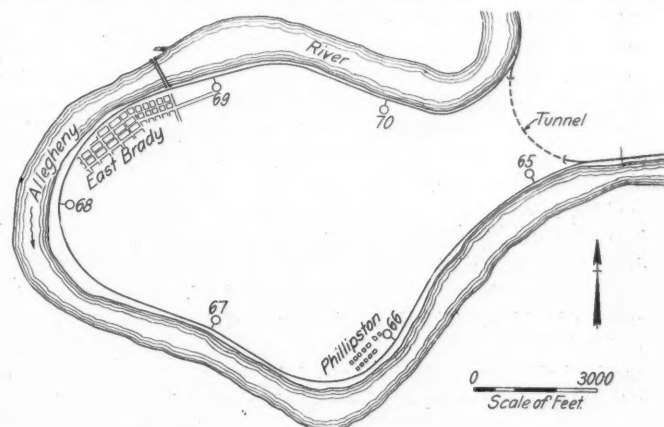
The approaches consist of side-hill cuts ranging in height from 10 to 100 ft. These consisted mostly of sandstone and were taken out by steam shovels, the material being disposed of along the river banks. Under-crossings were provided at each end, so that the material could be hauled away without interference with main line traffic. After 4,000 cu. yd. of material had been excavated at the south approach, the contractor was enjoined from disposing of any more material on the river banks until the harbor line was permanently established by the Secretary of War. During this delay the spoil from the excavation at the south end was turned over to the maintenance of way department of the railroad, on standard-gage flat cars, and hauled to various points on the division. The approach cuts required the removal of 55,800 cu. yd. of material.

TUNNELING METHODS

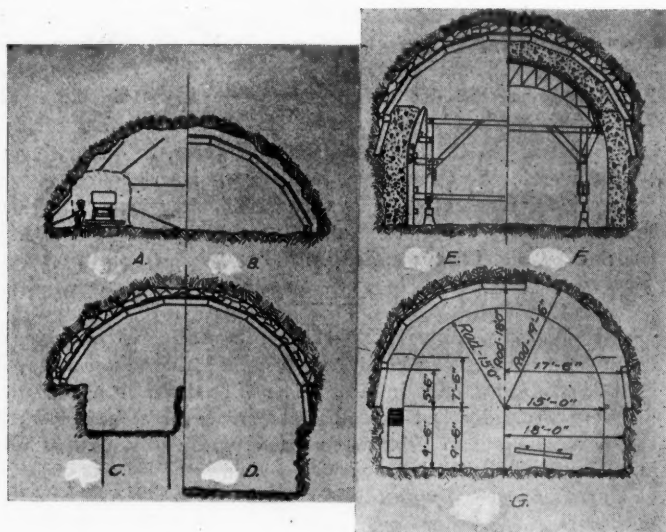
The headings were started in July, 1913, and in order not to wait for the completion of the approach excavation it was necessary to enter the tunnel proper through two side drifts from the face of the hill on a line at right angles to the center line. The drifts were 2,378 ft. apart and were carried to the center line of the tunnel proper, and then driven in both directions from that point. By the time the approach cuts were completed the heading at the south end had been driven and timbered 330 ft. and at the north end 135 ft. The headings were worked by driving two 8-ft. by 8-ft. side drifts adjacent to each side of the full tunnel section, at the elevation of the wall plate of the arch, 15 ft. above subgrade. They were driven from 15 to 20 ft. ahead of the timbering. The drill holes in the face of the drifts were in four horizontal series; four sub-cut holes 6 ft. deep were

allow the setting of one ring of timber at a time. The timber ring was cut on an 18 ft. radius and consisted of seven segments of 12-in. by 12-in. or 10-in. by 12-in. hard wood. Two-inch hard wood lagging was placed over the ring and the remaining space was packed with one- and two-man stone, except where there was from the knuckles of the ring and then packed. The record for lineal feet of heading timbered in one month at both ends, working day and night shifts, was 310 ft.

The bench material was worked by digging trenches, usually 6 ft. deep and of a sufficient width to permit the erection of a tripod drill and leave, at the same time, a sufficient width in the center to support muck tracks. Three holes were drilled to subgrade, one near the center line of the bench and one on either side 6 or 7 ft. from the wall plates. It was necessary to spring the holes several times, using 40 to 45 sticks of dynamite per hole, and thus obtain a pocket large enough for the final shot of



Map Showing Location of the East Brady Tunnel



Typical Sections, Showing Various Stages in the Construction of the Tunnel

loaded with four sticks of dynamite, four cut holes 8 ft. deep were extra large breaks, where the roof was supported on posts were loaded with six sticks, three straight holes 8 ft. deep were loaded with three sticks and two dry holes at the top 8 ft. deep were loaded with two or three sticks, all of 60 per cent dynamite. Muck was loaded into one-yard cars, pushed to the end of the bench by hand and dumped onto the muck pile, from which it was removed by a steam shovel. This haul varied from 100 to 600 ft., depending upon the progress of the bench excavation. Wall plates for the arch timbering were of 12-in. by 12-in. by 16-ft. hard wood timber and were set 15 ft. above sub-grade, 17½ ft. to either side of the center line.

As the material was of such a nature that the roof would not support itself for more than 4 or 5 ft., the core between the two side drifts was taken out in sections just large enough to

125 or 175 sticks per hole. These charges shattered the bench material sufficiently for ready handling by the shovel without any further shooting. The rock was loaded into 4-yard dump cars by a steam shovel operating by compressed air, and hauled to the respective dumps. The cars were placed one at a time at the left of the shovel by Porter 18-ton and Vulcan 20-ton locomotives, but wherever possible a siding was maintained 100 ft. or more in the rear of the shovel, upon which the empty cars were placed by the locomotive, three drum hoists being used to switch them to and from the shovel. By this method 100 cars of bench rock were removed in a 10-hour shift. In front of the shovel 12-in. by 12-in. plumb posts were placed under the wall plates from 1 to 7 ft. long, according to the distance to solid footing. In several instances the posts extended to subgrade; the condition of the wall plates and the overhead timbering governing the number of posts, which were placed on an average of 3 ft. apart. Frequently it was necessary to provide additional posts and renew old ones at the time of trimming. After the bench was excavated a variable amount of trimming was necessary to give a minimum thickness to the masonry of 3 ft., the trimming being done by means of Ingersoll-Rand Jap drills.

LINING AND PORTALS

The tunnel lining is of concrete, using a 1:3:6 mixture for the side walls and a 1:2½:5 mixture in the arch. The materials used were Lehigh Portland cement and Allegheny river washed sand and gravel, and in addition, 120 deg. of the arch crown was faced with a single layer of Mack vitrified paving brick as a protection against the disintegrating action of gases. The side wall forms were built of timber 42 ft. long, extending up to the edge of the brick lining. These forms were supported from a frame traveler which moved on a track laid on 12-in. by 12-in. timbers 2 ft. 3 in. above subgrade. The forms were adjusted laterally by means of turnbuckles and screwjacks between the forms and the traveler, which were supplemented by timber bracing to take up the concrete pressure. The concrete was placed by Pneumatic Concrete Placing Company's mixer and

conveyors. A mixer was set up at each portal until the lining was completed for a distance of about 750 ft. inside the tunnel, then the mixer was placed at a convenient point within the finished tunnel and the bins were fed by a conveyor. Delivery pipes were connected up and the material was placed from the top of the forms at either side, an average record for concreting the side of walls being 20 cu. yd. per hour. The forms were allowed to stand from 24 to 48 hours, according to weather conditions, before they were moved ahead.

The arch form consisted of steel lattice truss ribs supported on a traveler similar to that used for the side walls and running upon the same tracks. A platform was built at the elevation of the top of the traveler for handling the brick material for the brick work, which consisted of a single course laid in 1:2 cement mortar, one header course to four stretcher courses. The entire brick lining for a 32-ft. section of the tunnel was usually laid in about six hours. The brick work was allowed an initial set of from four to six hours, during which time bulkheads of bags of sand braced with planks were built to retain the concrete about to be placed. The concrete of the arch ring was generally placed at the rate of about 16 cu. yd. per hour. The forms for the arch were left in place from two to six days, according to weather conditions, before they were removed. A workman's retreat 5 ft. wide, 7 ft. 6 in. high and 2 ft. deep was provided in the side walls every 50 ft., and 4-in. cast-iron drain pipes were usually placed 13 ft. center to center, but were omitted where there was no leakage.

Both the north and south portals are of ashlar sandstone with concrete backing. The face of the portal has a batter of 3 in. to the foot, and the sandstone construction extends into the barrel of the tunnel a distance of 14 ft. at subgrade, reducing to 8 ft. at the crown of the arch because of the face batter. The parapet walls are 8 ft. high above the intrados at the arch crown and are capped with a 24-in. coping, 3 ft. wide. On the inside of the curve the end of the portal joins neatly with the rock cut of the approach, while on the outside a wing wall 38 ft. long is built parallel to a tangent to the curve at the face of the portal, the tops of these wings being finished in steps on a $1\frac{1}{2}$:1 slope, with a batter of 1 in. to 1 ft. on the face.

The power plant for the work was located at the south end of the tunnel. One Aimes locomotive type and two Fitzgibbons stationary boilers furnished steam for two Sullivan compressors having a capacity of 1,380 cu. ft. of free air per minute, a reservoir of 191 cu. ft. capacity being placed near the compressor. The air was piped to the south portal by a 6-in. line and over the top of the hill to the north portal by a line consisting of a 6-in. pipe for two-thirds of the distance, then reducing to 4-in. From the portal 4-in. lines were run to the shovels taking out material at the bench and reducing there to 2-in. lines, which were carried on to the drills. Electric lights were supplied at the south heading by a generator operated by a steam engine, which furnished light for the entire tunnel as soon as it had been holed through. Up to this time the light in the north heading was provided by a generator operated by a gas engine, and located at the north portal.

DIFFICULTIES ENCOUNTERED

The material encountered in the tunnel was of a varied nature. Extending for about 400 ft. from the south end it was a gray sandstone. This dipped down to the north and the remainder of the material in the heading was of various formations. A bluish shale rock that was broken with irregular thin veins of coal and small outcrops of sandstone prevailed, while near the middle of the hill there was a pocket of glassy soapstone resembling fire clay that dipped into the heading abruptly and after some distance disappeared. The blue shale rock, after coming in contact with the atmosphere, had a tendency to decompose, with the result that more weight was thrown on the timbering than had been anticipated. Whenever settlement of the timbering indicated this condition, measures were taken to strengthen it. False rings were erected between the original

rings and posts were also placed. In spite of these precautions, a number of very serious falls occurred, the rock in some places continuing to drop until a natural arch had formed with the top as much as 35 ft. above the top segment of the timbering. In all, 425 ft. of timbering fell, requiring 9,000 cu. yd. of extra excavation, 2,000 cu. yd. of additional concrete in the arch ring and 7,000 cu. yd. of slag packing.

The worst features incident to these falls were the delay and loss of plant. In August, 1914, two separate breaks in the roof several hundred feet in the rear of the shovel at the north end tied up the work of this shovel until the one from the south end could be brought around to uncover it. After a delay of two and a half months in the work of this shovel, another fall in January, 1915, fell directly on the shovel, partly covering it and causing serious damage. On May 2, a fall of 101 lin. ft. of the tunnel roof buried the shovel and completely wrecked it.

The restoration of the tunnel after the falls involved painstaking and skillful effort. The arch rings under the larger falls were greatly strengthened by increasing the thickness of the ring by 4 ft., but in addition to this great care was exercised in packing the space between the ring and the top of the void resulting from the fall. Of particular interest in this connection is the use of granulated slag (formed by quenching hot slag with water) for this purpose, and the application of this material by the use of the pneumatic concrete mixer. The material was simply blown dry, using the mixing and transmitting apparatus without modification from the arrangement when concreting. It was found possible to place and pack the materials solidly much more conveniently and cheaply than would have been possible with any other material or method. In fact, the slag packed so solidly that there was a shrinkage of 45 to 50 per cent from the volume as delivered in cars.

At the present time the heading has been holed through, and the tunnel is completed, including the lining, except for a distance of above 700 ft., where the bench has not been removed.

The construction of the East Brady tunnel has been handled by the engineering department of the Pennsylvania Railroad, A. C. Shand, chief engineer, and H. C. Booz, assistant chief engineer, with N. F. Brown, assistant engineer, in direct charge of the work. We are indebted to the engineers in charge of the work for much of the above data. The Allegheny Construction Company, Arthur McMullen, president, New York City, has the contract for the entire work.

THE WORLD'S PETROLEUM.—The production of petroleum throughout the world in 1914 was 400,483,489 gallons, as compared with 384,667,550 gallons in 1913. The United States headed the list very decidedly last year, the American yield having been 265,762,535 gallons in 1914, as compared with 248,446,230 gallons in 1913. Russia ranked second with a yield last year of 67,020,522 gallons, as compared with 62,834,356 gallons; while Mexico came third with 21,188,427 gallons, as compared with 25,902,439 gallons. India produced 18,000,000 gallons of petroleum in 1914, as compared with 7,930,149 gallons in 1913; Roumania, 12,826,579 gallons, as compared with 13,554,568 gallons, and the Dutch Indies, 12,705,268 gallons, as compared with 11,966,857 gallons. It will be seen that the United States last year contributed 66.36 per cent to the world's yield of petroleum, while the corresponding contribution of Russia was 36.74 per cent, and that of Mexico 5.29 per cent.

SCOTTISH RAILWAY DISCONTINUES BRANCH LINE.—The Highland Railway closed on August 7 the Keith and Buckie branch line, including the stations of Buckie, Rathven, Drybridge, Enzie and Aultmore. Through traffic from the coast line will not be interfered with, as passengers going east can go through Cullen and Portsoy, and those going west through Fochabers-on-Spey and Elgin. The general manager has explained that the branch has been closed because of a scarcity of motive power, and that unless the southern companies send help in the shape of locomotives and men other branches will have to be closed.

A CLERK'S PLEA

By M. S.

"Clerks are a crowd of competent and incompetent men—usually in blind-alley jobs, with no training and no outlook."

So much truth is contained in this simple statement that no one who feels the vital importance of having an army of competent and efficient workers, instead of an incompetent crowd, can help from memorizing it at the first glance.

The subject touched on by George M. Basford in the *Railway Age Gazette* of July 23, 1915, page 150, is almost of national importance since the stockholder, the employer, the employee and also the public, which has acquired the habit of holding the railroads to account, are concerned by it. This concern is often equally shared by many of that competent and incompetent crowd, and if the existence of such a crowd is too costly to be permitted the incompetent man is really the one paying the highest price for it. He is doomed to the average job which is filled at any time by anybody, therefore commanding a relatively small salary; the job which requires (not principally, but under the existing circumstances) no responsibility, where individuality is a quality uncalled for, hard work the source of fun for the fellow coworkers, who have long ago banished the desire to do something for the company so as to have something done for themselves, or who have never had such a desire. It reduces his productiveness, his ability—therefore individuality; it makes him a living automat with no desires to be fulfilled, no task to be accomplished. It gradually produces a man incapable of thinking, deprived of his sense of duty to do his best, deafens his conscience; in short, it makes him a degenerate, a man who does not actually steal nor commit crime, and yet is touched by the underlying factors of both evils. His task in life is to be at the office "on time," stay until quitting time, do enough to look busy and keep out of trouble, gossip whenever the chief clerk leaves the room, expect promotion with every vacancy for a higher position, and very naturally blame "the company" for not getting it.

Of course, there are hardworking, conscientious fellows who have the interests of the company at heart, but they are few, and it is only a question of time before unrecognized ability prompts them to look for another field.

Do not understand this as a personal plea, though I am a clerk, a railroad clerk with heart and soul, who entered railroad service, not because of lack of opportunity in other fields, but for the recognition of opportunities offered by a railroad, for the desire to study this vast industry which has made progress a reality. It is in behalf of the hundreds of my type that I venture to speak, not because we are better than the rest, but for the reason that we choose what the others consider a burden and therefore are a type of our own.

Among us are those who took up railroad work to make it their profession, to make the best of it. Have we succeeded?

To answer this question we must first analyze the meaning of the word profession. What is a profession? Is it not trained ability intelligently and successfully applied in a certain direction? If so, have we attained that high degree of training and intelligence in our daily work which will enable us successfully to apply our energy in the chosen direction? We have not; and therefore we are the unfortunate professionals without a profession.

We may be honest and earnest in our efforts, but the lack of skill, specific knowledge, proper experience and cultivated and trained self-confidence nullifies the results of our efforts, decreases the value of our energy, reduces our productiveness, removes the possibility of development, and we gradually join the undesirable class, which is inclined to exaggerate its value.

Is it our fault? If it is, our failure to do the right thing has not as yet been pointed out to us.

Not to praise ourselves, we are honest, conscientious, eager to accomplish something, to work for the benefit of the company and not merely for the salary; furthermore, to work because we consider ourselves fit for that kind of work better than for

any other, because (excuse the expression) we consider that work our life-mission. Will all of that make us efficient, masters of our profession? Positively not. Our ignorance—unpreparedness—does not permit us to fulfill our task.

Where can we get that needed knowledge and training? One knows where to learn the trade of a blacksmith, a carpenter, a tailor, the profession of a physician, a lawyer, but where must one go to study the profession of a railroad man?

You, men above us, we know that it is not your intention to hurt us by calling us a crowd of incompetents, that you fully sympathize with us; but why don't you help us to get rid of this incompetency? Why don't you require a standard amount of knowledge before giving us employment? Why do you blindly promote us on our supposed merits instead of applying the iron test of the standard examination? Why do you suffer our ignorance, which so fatally injures your business?

Of course, it is impossible to require a standard as long as there is nothing provided for its attainment, but why are there no schools for us? Why don't competent men in railroad science write books for us, thereby enabling us to make better workmen and employees? If such books are written why are they not placed within our reach—in the office, public library; why are they not recommended by our superiors? Why is our professional education left entirely to ourselves when it is of equal importance to our employer and when previous experience has shown that we totally neglect it? Why are such a few magazines published on railroads, and those published read by such a few men? Why is the literature of enlightening the man on the small job so limited? Why is there no co-operation between a man and his superior? Why should we not be made devoted friends, co-operators in the corporation giving us our bread and butter, instead of an ungrateful crowd habitually knocking the railroads; secretly talking about government ownership, about rebates to shippers of which the I. C. C. is ignorant, about watered stock, too large profits, and all the nonsense which is originated by the politician, cultivated by the shipper, and delivered to the public ignorant of such affairs by the daily press, whose editors dare not make suggestions to a doctor or electrician, but feel quite at home talking (spell same as knocking) a railroad? Why overlook the fact that before entering railroad service we were a part of that public whose sentiments, for reasons too numerous and various to mention, are antagonistic to the railroad, and that while there may be an excuse (if there is, I am ignorant of it) for not pointing out to the public their erroneously formed ideas, it is an absolute necessity to point out such ideas to us since we are employed by the railroad.

I am not suggesting that the railroad regulate our opinions, but would it not be fair to let us take a glance at this great issue from the railroad point of view? Furthermore, is it not as improper to employ a man who is not serving to the best of his capability, as it is to render service for a corporation considered unjust? Why not permit us to see the railroad issue from a point of view other than that inherited from our fathers and give us a chance justly to create public sentiment based on personal experience and study, not on baseless theories inspired by anything but truth and knowledge?

Of course, I am not entirely blaming the railroad for our unfitness, but are we not almost helpless in our struggle? While the requirements of a railroad man can roughly be described by many, who can say, "Go there, young man, there you may secure the knowledge essential for a good railroad man?"

It is an irony of life to neglect the greatest things. Take the greatest industry of the country—agriculture—and it is surprising to learn how few are the institutions teaching us to be good farmers. Step to the next largest field, the railroad field, and you find no school at all.

We are professionals without a profession, ignorant, incompetent, inefficient; yes, we take the blame, we deserve it. But have we ever rejected the remedy? Were we given a chance to do better and did we refuse it? Have our employers taken sufficient interest in us—the necessary links of their business—

to make us, at least to help us, to become what we ought to be?

It is a tragedy when under the pressure of correct as well as erroneous legislation, and of economic and political conditions the railroads, the greatest and the least appreciated contributors to the nation's present growth and wealth, are facing a crisis never witnessed before and are eagerly looking for the trained, intelligent and earnest men, whereas, on the other end, a crowd of incompetents, fully aware of their incompetency, are vainly stretching out their hands for training and intelligence of that kind which will give the restless brain rest, the unlimited ambition realization, the country good citizens and the employers efficient and useful men.

Help us. If there are schools in existence direct us to them. If there are none, create them. It will be an investment, not an expenditure. Help us to render you the service which you deserve.

THE RAILROAD AND THE HOBO*

By E. W. CAMP

Attorney for California; Atchison, Topeka & Santa Fe Coast Lines

Some weeks ago a brakeman while in discharge of his duty was killed by a hobo. Within 30 days the brakeman's heirs had put in a claim under the state compensation act. No strenuous effort has been or will be made by the state to find the hobo; but the state would have forced the railroad to pay for the hobo's crime except for the fact that the brakeman was engaged in interstate commerce.

But when a brakeman, instead of getting killed, gets the hobo off the train there is turned loose on the right of way a source of peril to train crews, freight and passengers. Dynamite is not hard to come by and bridges are numerous. Likewise a can of phosphorus may produce interesting results. Especially when tramps move through the country in organized bands the railroads cannot safely refuse to let them ride. But if the hobo could be kept off the trains the whole tramp problem would be much nearer solution. On the other hand, the railroad is a serious danger to the hobo. Hundreds of them are lured to death every year by the chance of a free ride. Apparently the states care little for either hobo or brakeman, otherwise they would long ago have found means to keep the wandering gentry off the tracks.

What shall be said, however, of the failure to protect children, women and old men who now use the tracks in the daily walks of life—and death—more than 10,000 a year paying the penalty of life and limb? Would not one suppose the governments might at least adopt measures to save the lives of their own citizens? And all these lives would be saved and injuries avoided were trespassers kept off the right of way, as in other countries. But what are the facts?

Three years ago a campaign was inaugurated by public-spirited railroad officials for laws to prevent this wastage of life, a wastage greater than that of all our wars except the civil. Bills were prepared for the legislatures of some 40 states. They were short and simple; simply prohibited under penalty all trespassing on railroad rights of way—confining the use of the roadbed to the purposes to which it is adapted. Were they welcomed and gladly passed? No, they were rejected in every single state. In one at least the railroad commission, when asked to advise the legislature, recommended that the bill be killed. That was rather astonishing, for the commissioners are able, fair and fearless, but after reflection we may conclude that they were right. They probably reasoned that the law if passed would not be enforced and did not wish to see another added to the multitude of dead statutes.

The capacity to make laws in our states and cities has far outrun the machinery and especially the energy of enforcement. I greatly fear that if in every one of those forty-odd states the bill had become law the number of trespassers and the dead and injured trespassers would be no less. In other words, no serious,

persistent effort to enforce would have been made. For the very statements which were used to support the bills to which I have referred showed conclusively that where laws or ordinances against trespassing exist they are not enforced, and the police and courts not only do not initiate steps to enforce them, but refuse to act when cases are brought to their attention. What is needed is not more laws but more law, better performance of the primary duties of government. We have become soft, flabby and think altogether too much of the suffering of the criminal. A law that does not mean suffering to its violator is no law at all and any expectation to enforce law without suffering is foolishness. I doubt if in any other civilized country there is such disregard of law, such a state of undiscipline and absence of respect for law, as exists in the United States.

But there were other and less worthy reasons for refusing passage to these bills. In one state at least representatives of certain unions demanded to know the author of this damnable attempt to prevent strikers from wrecking trains and killing scabs. To secure favorable action it would have been necessary to insert a proviso that trespassing shall be permitted during strikes.

We must surely wish all success for every effort to shorten the roll of death along the rails. But, in my humble opinion, there is in this and other respects only one hope, and that lies in putting into the hands of the federal government everything pertaining to the regulation of railroads. That these trespassers are an interference with interstate commerce there is no doubt. You pay damages in many cases where men, women and children are run down on the track. Hundreds of emergency stops are made in attempting to avoid injury to trespassers, and emergency stops mean damage to engines and cars, injuries to passengers, bruising and death of livestock, even damage to common freight. Stops must be made to pick up men killed or hurt, and a stop on the main line means danger of another accident. Trespassing means pilfering of cars and burning of structures not fireproof.

Now, the Supreme Court of the United States has held that the railroads are national highways, and that any railroad doing interstate commerce must have all its engines and cars equipped with all safety appliances as required by the federal law. Every railroad must keep all its accounts, whether of interstate commerce or not, according to the rules of the federal commission. There can be no doubt that the general government may regulate everything pertaining to the maintenance and use of the roadbed and incidentally forbid its use by any other persons than railroad employees and for any other purpose than the rolling of cars. In fact, when it is once conceded that the federal government has power to own and operate railroads it must be admitted that it has power to do anything short of that. In this, as in other matters, your hope lies in replacing by a single national control the conflicting, shifting, multitudinous regulation of states, cities, counties and villages.

THE PARIS NORD-SUD RAILWAY.—Last year was the fourth during which the Paris Nord-Sud Railway had been worked. This line, which may be described as the younger sister of the "Métro," has just issued its annual report, which shows how gravely it has been affected by the war, like the larger and older undertaking. Mobilization exercised an extraordinary effect on the Nord-Sud. If the military authorities had not granted a brief stay, the company would on the eleventh day of mobilization have been left with only one motorman; and, as a matter of fact, the traffic had for a time to be worked with no more than 153 employees, of whom 64 were women, compared with the 1,096 who figured on the pay sheets at the beginning of last year. Nevertheless—and largely owing to the zeal of the wives of employees called to the colors—it was possible to maintain an uninterrupted though restricted service to meet the requirements of the public, and at the end of the year the staff had grown to 691, of whom 231 were women.—*Railway Gazette, London.*

*Address before the American Association of Railroad Superintendents at San Francisco on August 21, 1915.

The Railways and the California Expositions

First of Two Articles on the Preparations Made by the Roads, Attendance, Passengers Carried and Exhibits

The Panama-Pacific International Exposition at San Francisco and the Panama-California Exposition at San Diego, held this year in celebration of the opening of the Panama Canal, are of interest to railway men in several ways. The opening of the canal was itself a great transportation event. The expositions have stimulated travel to California and the West in general in such proportions as to require a great deal of preparation for it on the part of the Western railways, and during the past few weeks to such an extent as to tax the facilities of the lines serving the Pacific Coast. It is believed that the expositions have introduced large numbers of Eastern people to the attractions and opportunities of the far West in such a way as to have a permanent effect both in the way of stimulating future travel and in attracting settlers. Moreover, the railways themselves have taken an active part in the effort to make the expositions a success, spending large sums in advertising them and making low rates, and the transportation exhibits at the San Francisco Exposition, of the railways and of the railway supply companies, are among the most interesting features.

The Panama-Pacific International Exposition was opened on February 20 and will close on December 4, while the Panama-California Exposition at San Diego was opened on January 1, and is to remain open through the calendar year.

RATES AND ROUTES

On account of the expositions the railroads early announced round-trip rates to California on a basis lower than has been made for summer travel to the coast for several years; \$50 from

miles and the \$80 rate well over 6,000 miles, making the rates per mile approximately 1.25 cents and by some routes as low as 1.12 cents.

PREPARATIONS MADE BY THE RAILWAYS

The railways have been preparing for handling the exposition business for two or three years. The first preparations consisted mainly of arrangements for adequately advertising the event, and a vast amount of literature has been prepared by the railway advertising departments on the exposition and the points of interest to which the special exposition rates would naturally attract many visitors.

The Atchison, Topeka & Santa Fe also built a new passenger station in San Diego and the Southern Pacific built new stations at Los Angeles and at Third and Townsend streets in San Francisco, partly to accommodate the increased travel expected this year. These stations are illustrated herewith. The new Santa Fe station at San Diego, completed on December 31, 1914, is an adaptation of Spanish colonial architecture to the commercial requirements of a railway, the chief features of the plan consisting of an open-air waiting room or patio and a long covered concourse uniting the different elements of the station. This building cost \$260,000, and with the covered concourse occupies an area 106 by 650 ft. The main waiting room is 55 by 170 ft. The architecture is in harmony with the exposition buildings. The covered concourse consists of an arcade 650 ft long and 27 ft. wide connecting the passenger station with the baggage and express departments. This, with the patio and the two towers



Southern Pacific Station at Los Angeles and Santa Fe Station at San Diego; Both Built to Accommodate the Exposition Crowds

the Missouri river, \$62.50 from Chicago and from \$94.30 to \$98.80 from New York, the lower rate applying via the differential lines. These rates were made effective from March 1 to November 30, with a final return limit of three months from date of sale, but not later than December 31. Liberal stop-overs have been allowed on both going and return trips and many free side trips were offered, so that considering the total mileage thus made possible the rates offered have probably been the most liberal ever offered for travel to the Pacific Coast. The rates were made available by a great variety of routes and with an additional fare of \$17.50 via Portland, Tacoma and Seattle almost any combination of routes, including steamship lines along the Pacific Coast, could be selected. Several of the roads published booklets outlining 40 or more routes which were available from the Middle West. Tickets via most of these routes included the round trip from Los Angeles to San Diego and return and free side trips were offered to Denver, Colorado Springs or Pueblo, Salt Lake City, Seattle and Tacoma, and many other points from the routes which do not reach them directly. Low rates were also made for side trips to many other points of interest. With the free side trips added the \$62.50 rate from Chicago covers from 5,000 to 5,400

flanking the arch at the entrance to the waiting room, forms the principal architectural features of the exterior.

The Southern Pacific station at Los Angeles replaced the old Arcade station and is especially interesting on account of the convenience of its arrangement. Indicators are placed at all entrances to trains for the information of passengers, and the trains are reached by inclines and a subway, which does away with the necessity of crossing any track and makes it unusually easy to locate the right train. The main concourse is large, light and airy. At the north is a rest room for women, at the south a smoking room, and the mezzanine floor is fitted up as a lounging room for men.

The ticket office represents an innovation in station architecture. It is located in the center of the main waiting room and instead of the clerks waiting on the public through windows from a closed-in ticket office they are placed behind a low counter which puts them in a more approachable position. Instead of the usual ticket cases the tickets are kept in a revolving drum at the clerk's side, so that he does not have to turn his back to a customer. This plan the management believes will result in better service, and it has also been adopted in the new station in San Francisco.

This is the terminus of the company's lines running through the old mission towns, and, therefore, the mission style of architecture has been adopted. This is also a very attractive and convenient station.

Several of the transcontinental roads put on new trains in anticipation of the exposition travel. The Atchison, Topeka & Santa Fe, on February 7, put in service a new train called "The Missionary" from Chicago to Los Angeles and San Francisco, and also a new train between New Orleans and California. On April 12 a new train called the "Scenic Limited" was put in service between St. Louis and San Francisco by the Missouri Pacific, Denver & Rio Grande and Western Pacific. New service was also established on May 30, June 19 and June 20 by the Chicago & North Western, Chicago, Milwaukee & St. Paul, Chicago, Burlington & Quincy, Chicago, Rock Island & Pacific and Wabash in connection with the Union Pacific and other Western lines, the Union Pacific putting on three additional trains in each direction.

ATTENDANCE AND PASSENGERS CARRIED

With the exposition period only partly over it is, of course, impossible at this time to accurately gage its success as compared with other expositions as measured by attendance or the number of passengers carried by the railways, but some figures are available covering July and a part of August.

On August 20, after the San Francisco exposition had been open for six months, the total attendance as given out by the exposition officials was 10,813,153, an average of nearly 60,000 a day. The attendance figures by months are as follows:

February	830,980
March	1,690,042
April	1,439,777
May	1,677,947
June	1,584,198
July	2,157,661
August (20 days)	1,432,545
Total	10,813,153

On September 4 it was reported that the attendance had passed the 12,000,000 mark. About one-third of the attendance has been free, including employees, exhibitors, press representatives, etc. The attendance at first was very large and during the first few days, after the special rates went into effect, the travel from the East was very heavy. The attendance during the opening week was 519,599, but after the first month both the attendance and the passenger traffic from the East were considerably reduced until the vacation season, toward the end of June, when both the attendance and the number of passengers from the East began to increase rapidly. From July 1 on, the attendance increased at an average rate of about 10,000 a day for a time, and the increase continued through August. The highest recorded attendance for a week was 559,936, for the week ending August 8, which exceeded that of the opening week by about 40,000.

The attendance at the San Diego exposition for the first six months was 1,265,718.

During the first days after the special rates went into effect all of the roads out of Chicago ran their trains with extra cars and in several sections, and during the vacation period some trains were run with extra sections every day. Practically all of the lines participating in the transcontinental business have shown a considerably increased travel, but for a time, between the first rush and the heavy summer travel, business was so light that many of the roads were greatly disappointed with the results. Considering the entire season to date, while the California terminal lines, which are all fed by a number of intermediate lines, have enjoyed an unusually large traffic, the more easterly lines that have had to divide the business to a greater extent have not fared so well and many have reported that business has not been up to their expectations. No statistics are available showing the total number of passengers carried to the expositions by the railways, but the number handled on the special rate round-trip through tickets from the East is indicated by the fact that 218,000 of these tickets from points east of the Rocky mountains had been validated at San Francisco, Los Angeles, San Diego and other points on the coast up to August

25. As the heaviest travel was during the months of July and August, a large number of Eastern people were in the West at that time who had not yet had their tickets validated for the return trip.

Figures compiled by individual railways show a large amount of duplication because so many passengers took advantage of the wide variety of routes offered to go out by one line and return by another, and most people rode over two or three lines in California or took a steamboat trip for part of their journey. Also, of course, the number of passengers carried by single lines gives no indication of the length of haul.

CALIFORNIA TERMINAL LINES

The lines to San Francisco, which have handled all the through passengers to the exposition in that city, except those carried by the steamship lines, are the Southern Pacific, the Atchison, Topeka & Santa Fe and the Western Pacific. The Southern Pacific, with its Shasta route from the north; the Ogden route from the east, and the Sunset route from the south, connecting with the various lines running from the Middle West, naturally has handled the bulk of the passengers into and out of San Francisco, and has probably handled a very large percentage of all of the through passengers over at least a part of its lines. This road, therefore, showed the remarkable increase of 300 per cent in its trans-



Southern Pacific Station in San Francisco, Built to Accommodate the Exposition Crowds

continental passenger business for the month of July as compared with July, 1914. From February 20, the date of the opening of the exposition, until July 31, the Southern Pacific received from or delivered to its Eastern connections a total of 280,095 passengers traveling on the special exposition excursion tickets, of which 120,777 were handled in the month of July, and 75,083 during the last two weeks of July. During the same period a total of 212,100 passengers to the exposition were handled on local tickets, the heaviest movement also being for July with a total of 64,354. During March the Southern Pacific handled on its system 33,238 westbound transcontinental passengers, as compared with 21,016 in March, 1914; in April the total was 29,118, as compared with 20,337 for the corresponding month in 1914, in May 32,042, as compared with 14,528, in June 49,171, an increase of about 30,000, and in July 78,582, an increase of 59,683. Most of these passengers visited southern California as well as San Francisco. Up to August 16 the Southern Pacific had handled 117 special trains averaging at least 125 passengers each, and 190 special car parties, averaging at least 20 passengers to a car, in addition to special parties handled on extra sections of regular trains. On July 16 there were 24 special trains and special car parties on the system. Between Los Angeles and San Francisco the Southern Pacific in July handled 99,340 passengers, as compared with 17,962 between the two cities in July, 1914. Between San Francisco and Portland 39,471 passengers were carried in July, 1915, as compared with 9,573 in July, 1914. During July and August

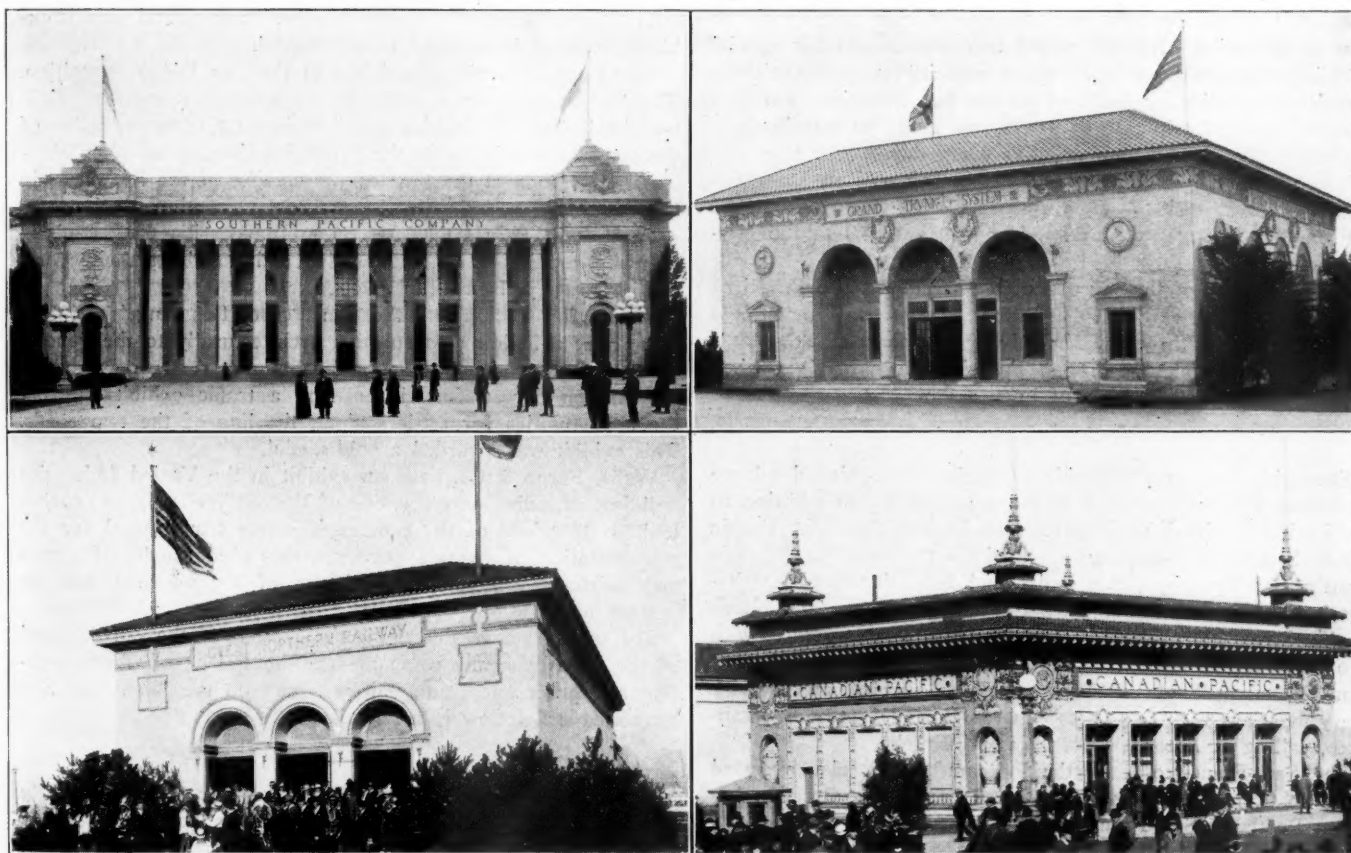
the Overland Limited, the Pacific Limited, the San Francisco Limited and frequently the Atlantic Express were run in two sections between Ogden and San Francisco, and between Los Angeles and San Francisco "The Lark" was run in three or four sections every day northbound and in two sections southbound, while the Shore Line Limited was run in two sections northbound, and extra equipment was run on all other trains. On July 20 "The Coaster," a day train from Los Angeles to San Francisco carried 692 passengers. For a time it was necessary to deadhead empty trains between the two cities.

The Atchison, Topeka & Santa Fe, which is the only single through line from Chicago to California, and which also reaches both San Francisco and Los Angeles, as well as being the only line to San Diego, also participated to an unusually large extent in the exposition travel. On March 1 the California Limited was run in eight sections. During July the passenger business west of Albuquerque showed an increase of 40 per cent, and 54 special trains were handled westbound and 43 eastbound.

The Grand Canyon on this line was also an added attraction,

As the Santa Fe had the only rail line San Diego, it enjoyed an unusually profitable business between that city and Los Angeles. Nearly all of the round trip tickets from the East to California included a coupon for the trip from Los Angeles to San Diego without extra charge and a large percentage of the tourists took advantage of the opportunity. Figures showing the number of passengers handled by the Santa Fe on this line were not available, but the total attendance from January 1 to July 1 was 1,265,718. With six regular scheduled trains in each direction many trains were run with extra sections, and as a large percentage of the travel was on day trains this was an unusually profitable business, capable of being handled in an economical way. With day coaches it was possible to seat 80 passengers in a car, as compared with almost 24 in a Pullman, and it was also possible to accommodate the number of cars in a train to the number of people who wanted to go on that train so that the trains were just comfortably filled.

Officers of the Western Pacific estimated that this line had handled over 400 through passengers a day into San Francisco during June, July and August, and a slightly larger number



Railway Buildings at the Panama-Pacific Exposition

and during July and August three trains a week were run directly to the Canyon in each direction. On some days as many as 1,500 people visited the Canyon, the average for July being 575 a day, requiring the installation of temporary facilities, such as tents and parking cars. During the first months after the opening of the exposition the travel was of course largely westbound and equipment was moved east empty, but since June the business has been well balanced, although it has been necessary to deadhead equipment in both directions in order to maintain the standards for certain trains. During the first two weeks in July the Santa Fe handled more Pullman equipment in Los Angeles than was handled in New York City by both the Pennsylvania and New York Central lines.

The heavy travel also made the problem of serving meals an important one, and during recent weeks the experiment has been tried of stopping the limited trains at eating houses in addition to carrying dining cars.

in the reverse direction, in connection with the Gould lines and other connections east of Salt Lake City. July showed the largest passenger business in the history of the company, and as the local passenger traffic is comparatively small, the increase is attributable to the exposition travel. In addition to three regular trains each way a day, filled to capacity and with frequent extra sections both eastbound and westbound, the Western Pacific handled about one special train a day on the average in each direction.

The heaviest train was the Scenic Limited, running solid from St. Louis over the Missouri Pacific and Denver & Rio Grande, which was put on to accommodate the extra travel early in the season. The Western Pacific also handled four sleeping cars from Chicago every day, two from the Chicago, Rock Island & Pacific and two from the Chicago, Burlington & Quincy.

The San Pedro, Los Angeles & Salt Lake also experienced an unusually large increase in passenger traffic on account of

the expositions. During July this road handled 35,707 through passengers between Los Angeles and Salt Lake, including 16,966 received from connections, westbound. August promised to show even higher figures. In June the total was 24,835, and in May 16,604. This road has three regular through trains in each direction a day, which were run in sections several times a week during July and August, and up to August 15 had handled 112 special trains and sections for organized parties. At the beginning of the season this company took over all the eating houses on its line in order to make sure of good service and turned over their operation to the dining car department. On the Pacific Limited train the plan was tried of serving an attractive 50-cent club luncheon in the dining car, which proved very popular and increased the dining car receipts. Its subsidiary, the Pacific Navigation Company, operating the steamships Yale and Harvard, which during the summer make four trips a week in each direction between San Francisco, Los Angeles and San Diego, carrying from 600 to 900 passengers each per trip.

Low rate excursion rates were also made during the summer for local travel between Los Angeles and San Francisco and between Los Angeles and San Diego. To San Diego rates as low as \$4 and \$5 for the round trip were made for special occasions, for a distance of 250 miles, while tickets good for three months were sold for \$6.25. Between San Francisco and Los Angeles a round trip rate of \$18.75 was made on certain days, while a rate of \$22.50 was effective every day.

The westbound exposition traffic was balanced to some extent by "back east" excursion rates—\$72.50 to Chicago and return, \$110.70 to New York and return, and \$60 to the Missouri river and return.

An illustration of the concentration of traffic at San Francisco is afforded by the fact that 449 Pullman cars were brought into San Francisco in three days in July by all roads, and the Pullman Company's laundry in San Francisco during July washed from 75,000 to 82,000 pieces of linen a day.

STEAMSHIP LINES

Steamship lines on the Pacific coast also have enjoyed a large passenger traffic on account of the expositions. In addition to the Pacific Navigation Company, already mentioned, the Pacific Coast Steamship Company operated two steamships between Seattle, San Francisco, San Pedro and San Diego and two between San Francisco, San Pedro and San Diego. The North Pacific Steamship Company also operated a weekly service with two boats between Portland and San Diego, calling enroute at San Francisco, Santa Barbara and Los Angeles, and service every five days with two boats between Portland and San Francisco, calling at Astoria, Coos Bay and Eureka.

The San Francisco & Portland Steamship Co. also operated three boats, making trips every five days in each direction between Portland, San Francisco and San Pedro.

RAILWAY EXHIBIT BUILDINGS

Four railway companies have exhibit buildings of their own at the San Francisco Exposition, which are illustrated herewith. Chief of these is the Southern Pacific Building, of modern Renaissance architecture, 200 ft. square, well located at the head of Palm avenue, near the Fillmore street entrance to the grounds. This building is kept open daily from 9.00 a. m. to 8.00 p. m. for the convenience of visitors, and among its features are comfortably furnished rest rooms for women and men, provided with desks, writing materials and files of newspapers, a spacious foyer which is a convenient place in which to arrange to meet friends, a ticket office and information bureau where are located representatives of the Southern Pacific and of its principal eastern connections, and a validation office. The building also contains a central court called "The Glade," where at frequent turns in the pathway appear natural panoramic views depicting scenes along the Southern Pacific lines. In a small theater, patterned after the Little Theater in New York, three

lecturers alternate in giving travel talks. These lectures, given eight times a day, have been attended by from 100 to 500 persons each.

The Canadian Pacific has a building on the Marina devoted to the products and resources of Canada, which includes a rest room and lecture room in which motion pictures are shown, a model of the company's supply farm at Strathmore, Alberta, and a model of the irrigation dam at Bassano, Alberta.

The Great Northern building, also located on the Marina, contains writing tables for the convenience of visitors, samples of the products of the Northwest, a lecture room in which are shown motion pictures accompanied by lectures on the resources of the Northwest, and illustrations of scenes in Glacier National Park. Eight full-blooded Blackfoot Indians from Glacier National Park, sent to the exposition as delegates from their tribe, make their headquarters here and entertain visitors with their ceremonies and dances.

The Grand Trunk and the Grand Trunk Pacific also have a building on the Marina, in which are shown samples of the products of Canada and illustrations of scenes along the lines of these companies, and motion picture lectures are given.

The Canadian Pacific, Great Northern and Grand Trunk exhibits were each awarded a gold medal.

There are few railway exhibits at the San Diego exposition. The Atchison, Topeka & Santa Fe has a concession on the "Isthmus," called the "Painted Desert," an interesting reproduction of the conditions existing in the Spanish provinces of New Mexico and Arizona at the time of the coming of the Spaniards in the sixteenth century, which to some extent continue to the present day. The exhibit consists of an Indian village of Pueblos, in which a number of Indians live and go about their work, making pottery, baskets, blankets, etc.

The Union Pacific and the San Pedro, Los Angeles & Salt Lake have a building conforming architecturally to the general plan of the exposition structures, containing rest rooms and an information bureau for visitors and a traffic exhibit showing the opportunities for settlers along the line of the two roads. This exhibit was awarded a gold medal.

Wells, Fargo & Co. have an exhibit in the Varied Industries building, including an office, one of the old Wells Fargo coaches built in 1863, one of the company's safety trunks used for the transportation of express packages, and photographs of scenes and incidents illustrating the history of the company and its present methods.

The second article, describing the exhibits of the railways and of the railway supply companies in the Palace of Transportation and other exposition buildings and on the "Zone" at San Francisco will follow in a later issue.

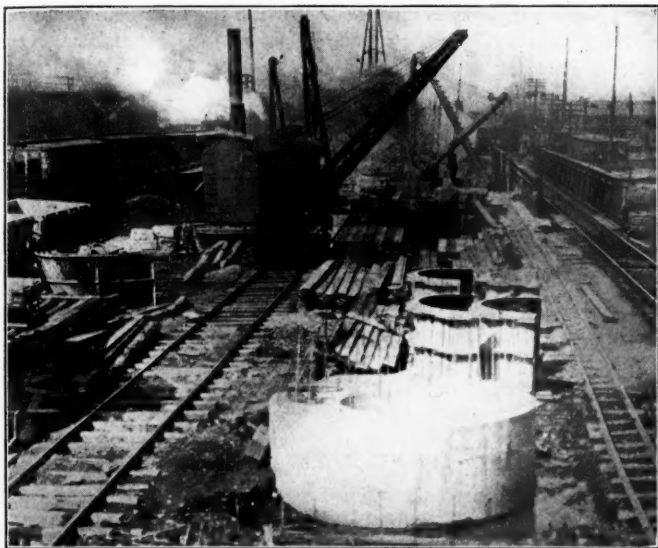
ADVANTAGES OF MOBILIZABLE PROPERTY.—For the first time in many years The Official Guide appears without the sailing schedule of the Pacific Mail Steamship Company. The service of that company has been discontinued owing to legislation last winter in Washington. It is reported that the ships are to be sold to companies which will operate them on other routes. It would doubtless be a not unwelcome circumstance to many owners of railroads of they, too, were able so easily to move their property under its own steam out from under the strenuous hand of full-crew laws and such iniquities of regulation.—*Official Railway Guide.*

CANADIAN SHIPBUILDING.—The Canadian Department of Marine and Fisheries reports that Canadian shipbuilding represented last year an aggregate new displacement tonnage of 43,346 tons—the largest annual total attained during the last fourteen years. Of last year's total, 23,167 tons were credited to the province of Ontario, which has been advancing as a shipowning and shipbuilding province since the development of trade upon the Great Lakes began to require a larger class of steamers.

An Interesting Structure Over the Buffalo River

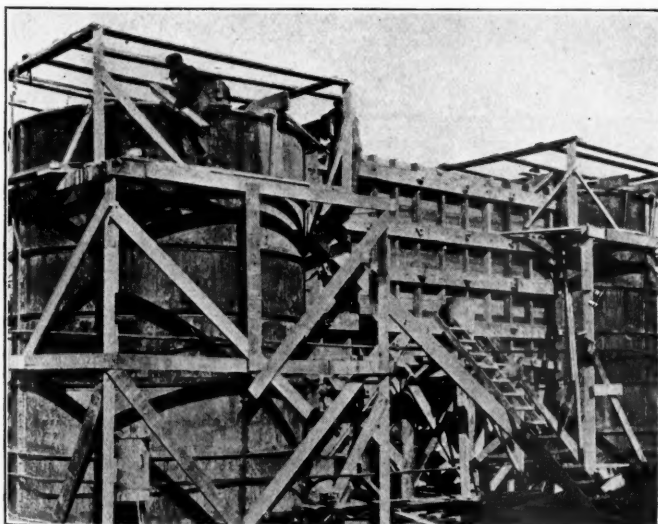
The Lackawanna Is Now Building a Strauss Bascule Span Involving Complicated Foundation Problems

In the *Railway Age Gazette* of January 31, 1913, there appeared an article describing three lift bridges built over the Buffalo river, Buffalo, by the Lake Shore & Michigan Southern, the New York, Chicago & St. Louis and the Pennsylvania jointly, and the Buffalo Creek Railroad. These bridges were made necessary by the deepening of the Buffalo river to 23 ft. at mean water level, to allow navigation by the deep-draft vessels travers-



General View of Bridge Site, Showing Completed Cylinder Pier and Diverted Westbound Track

ing the Great Lakes. Since then the deep-water navigation of this stream has been authorized to its junction with Cazenovia creek, a little over a mile beyond the crossing of the Buffalo Creek Railroad, the present terminus of the deep-water dredging. This improvement will necessitate three additional lift bridges over the



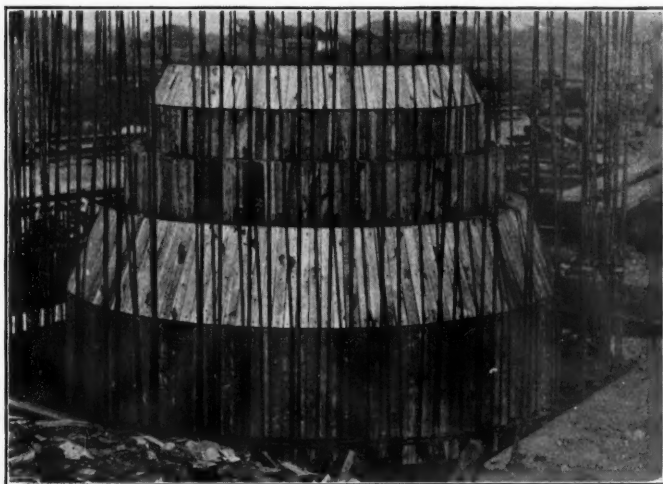
Forms in Position to Concrete Transverse Strut of Cylinder Piers

Buffalo river, two to be built by the Delaware, Lackawanna & Western and one by the city of Buffalo, on the line of Abbott road.

This article describes the double-track lift bridge which the Delaware, Lackawanna & Western is now building a short distance east of the present grade crossing of the New York, Chi-

cago & St. Louis, the Pennsylvania and the Buffalo Creek railroads. The present bridge consists of two double-track plate girder fixed spans, each about 116 ft. long, supported by two abutments and one central pier of coarsed ashlar stone masonry, with a track elevation about 18 ft. above mean river level, which conforms very closely with that of Lake Erie, into which the Buffalo river empties, about five miles farther down stream. In rebuilding the bridge the rail elevation is being raised 22 ft. at the river crossing to cross the joint tracks of the New York, Chicago & St. Louis and the Pennsylvania, and the tracks of the Buffalo Creek railroads overhead. The track was raised 26 ft. at the crossing to give ample head room. At the same time the river crossing was moved about 200 ft. farther east to rectify the existing channel of the Buffalo river, which is now being dredged by the Great Lakes Dredge & Dock Company, under contract with the city of Buffalo.

An examination of the map shows that the river is very sinuous at this locality, three sharp "ox-bow" bends doubling upon themselves. The proposed new channel shown in dotted



Inside Form for Cutting Edge of Cylinder Pier. Reinforcing Bars in Place

line was never constructed mainly on account of the opposition of the riparian owners.

An embankment adjoins the east end of the new bridge, which carries the railroad to the next river crossing, a little over half a mile farther east. A short embankment will join the west end of the new bridge, followed by a short bridge span, and then by two longer spans over the railroads mentioned.

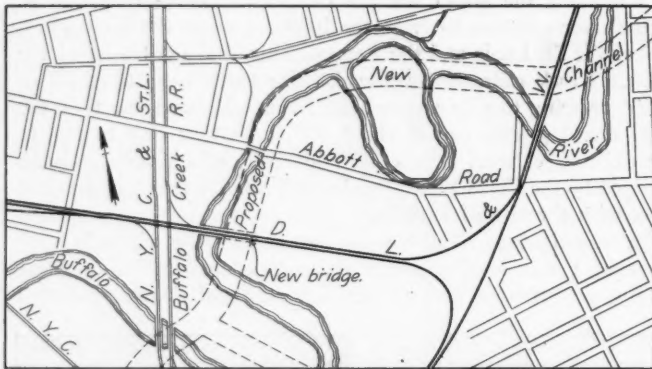
After the type of bridge and spans had been decided on five test holes were put down on the site of the new piers, four on the east side and one on the west side of the river. One of the four holes was only put down part way because of an obstruction, necessitating a new hole in another position close by. These borings were made by contract. Steel pipe was first driven and the material inside brought up in its natural condition by earth augers instead of by the wash-drill method. It is claimed that the "dry method" gives by far the best information as to the actual character of the material penetrated and encountered.

The crossing of the river is square or at right angles to the river current. The main channel span of the new bridge is a Strauss bascule, with a 114-ft. opening between the pier faces. There is an auxiliary fixed deck-plate girder span on the west with an opening of 107 ft. between pier faces. In addition there is a short girder span at the east end 36 ft long between masonry faces and one at the west end with a 39-ft. opening, the slightly

longer span being due to the change in plan of the west pier. Until the new channel is excavated the old one must be maintained and it will be crossed on temporary plate girder spans secured from other work.

As the new bridge occupies the present alignment the plate girder spans for each track comprising the old crossing were each moved outward $41\frac{1}{2}$ ft., or 83 ft. between centers to allow working space for the new structure.

Pile bents were driven for the end and center supports of these old girders. The spreading of the old tracks was also continued for a considerable distance east and west of the bridge crossing to allow the building of the embankment, made necessary by the raising of the grade. As the base of this new embankment



Map Showing Channel Change and Location of Bridge

occupies a greater width than that available between the tracks temporary lines of piling and timber cribbing were placed to prevent the encroachment of the embankment.

The superstructure of the bridge is carried by two abutments and four piers. The abutments have no wing walls, the embankments spilling around them at the ends. They are founded on piles driven to rock. The height of the east abutment to base of rail is 43 ft. and that of the west abutment 49 ft., the lengths of the supporting piles being respectively 55 and 49 ft.

The piles for the east abutment were driven by a land driver, after suitable excavation had been made, the material being removed by locomotive crane with an orange-peel bucket. The

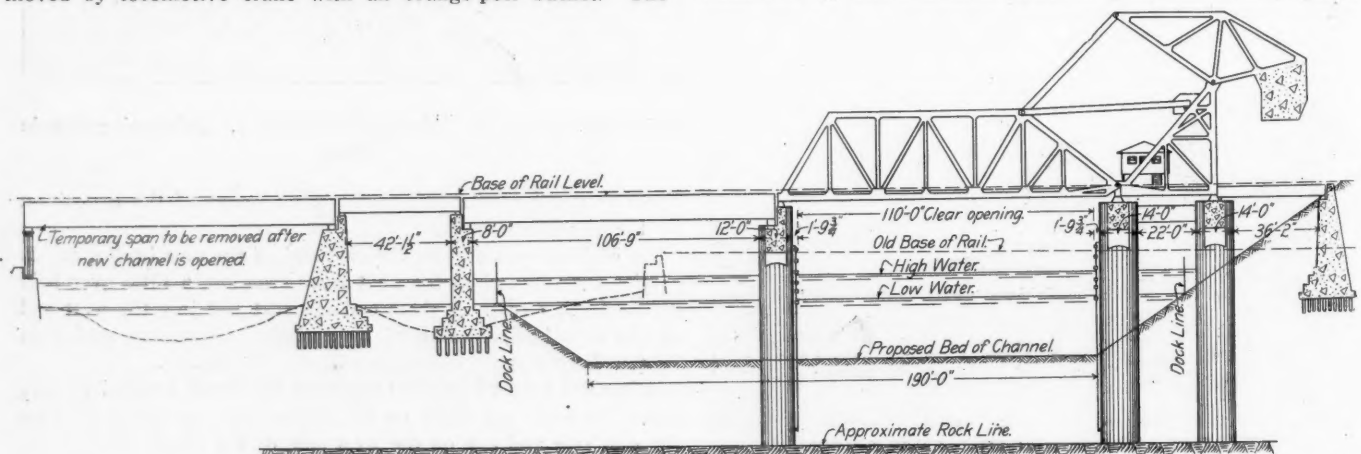
of the piles for the west pier are 12 ft. below water and were also driven with a follower. All piles are of Southern pine with the smaller end 8 in. and the larger 14 in. in diameter.

After the foundation piles had been driven the cofferdams were constructed, the larger one being about 55 ft. long and 30 ft. wide, and the smaller one 55 ft. long and 21 ft. wide. They were built of Wakefield sheet piling, driven by the same pile-driver that drove the foundation piles. It was about 27 ft. long and projected about 3 ft. above water level. In driving the sheet piling an imbedded butternut log was encountered which gave considerable trouble, causing much leakage, which was finally overcome. Interior bracing was added as the cofferdam was unwatered.

The main or tower piers of the bascule span consist of four concrete cylinders in pairs, connected at the top both transversely and longitudinally by heavy concrete struts. The cylinders are 14 ft. in diameter and average about 90 ft. in height. The rest pier is composed of two cylinders of similar construction, each 12 ft. in diameter.

The cylinders were sunk through about 70 ft. of material, consisting of 6 ft. of filled-in ground, 14 ft. of black clay, 12 ft. of sand and gravel, 28 ft. of clay and, finally, 10 ft. of sand and clay overlying the limestone bedrock. After the location of the pier was established, an excavation about 4 ft. deep and 20 ft. square was made, which was lined with cribwork, built up of 12 in. by 12 in. timbers. Upon the prepared bottom of the excavation was placed a steel ring with a diameter 6 in. larger than that of the finished cylinder pier and forming the cutting edge for sinking it. This ring was 20 in. high and a shelf 8 in. wide was riveted to its inner edge. A wooden form having roughly the shape of a truncated cone, was then fitted to the ring and formed the inside of the concrete cutting edge. This consisted of a series of inclined and stepped surfaces, intended to control and accelerate the sinking of the piers.

The outside forms were steel rings 5 ft. high, stiffened both horizontally and vertically by angles and built in halves with angles at the abutting vertical edges to serve as flanges for bolted connections. Before filling the form the outside ring was securely held in position by struts braced against the timber cribwork lining the excavation. This steel-concrete cutting edge was reinforced by two concentric rows of plain steel rods, spaced



Elevation of New D. L. & W. Bridge Across Revised Channel of the Buffalo River, Buffalo

sides of the excavation were vertical, supported by sheet piling, which was first driven and then braced as the excavation proceeded, and which stopped at an elevation about 2 ft. below water level. The piles were then driven with 3-ft. intervals each way to bed rock and cut off at an elevation of 1 ft. below low-water level.

The piles for the west abutment, as well as those for the west pier, were driven by a floating piledriver. The west abutment occupies the site of the central pier of the old bridge, which was removed. The top of the supporting piles are 7 ft. below water level and were driven to this depth with a follower. The tops

about 12 in. between centers. The bars of the outer row were carried up vertically about 4 in. inside the outer circumference to the top of the pier, while the bars of the inside row, which start adjacent to the outside row at the bottom, were bent to come within 4 in. of the inner circumference and terminate at the top of the first course or section of concrete.

The cutting edge formed the lower or initial course of the cylinder pier, being an annular ring of concrete 14 ft. in outside diameter for the large piers, and 12 ft. for the smaller ones, with central concentric openings or wells 7 ft. in diameter. To build the second course, the outside steel form was raised 5 ft.,

and a cylindrical concentric inside form was hung from timbers resting upon the upper edge of the outer form. After several sections had been built in this manner, a locomotive crane was employed to remove the material inside the well and underneath the cutting edge, using an orange-peel bucket. It was aimed to secure an average daily settlement of about 10 ft., successive courses of concrete being added to give the necessary weight until bedrock was reached. After the surface of the rock was thoroughly cleaned the space under the cutting edge was sealed with concrete, which was also used to fill the central well.

No difficulty was experienced in sinking cylinder 4 N, but some trouble was encountered in cylinder piers 3 S, 3 N and 4 S. After cylinder 3 S had reached a point within 8 ft. of bedrock, a large amount of material was removed without any corresponding settlement. Investigation developed that material of a soft nature was flowing in at the bottom from a north-easterly direction, between cylinders 3 N and 4 N, and which caused a subsidence of the surface of about 9 ft. between them. This subsidence caused cylinder 4 S, which was within 12 ft. of bedrock at the time, to move in a northwesterly direction, affecting its perpendicularity. The cylinder was restored to its normal position by means of a 35-ton jack braced against the side of cylinder 3 S with wooden struts. After cylinder 3 N had reached within eight feet of bedrock, further movement was prevented when the northwest side of the cutting edge encountered a very large boulder which could not be removed by excavation from within the cylinder. To overcome this a well drill was used to drill a hole close outside the cylinder to the boulder, and the latter was then shattered by a heavy charge of dynamite. After these mishaps, air locks were installed on cylinders 3 N and 4 S, and the sinking continued under compressed air at a pressure of about 28 lb. After reaching bedrock it was found that cylinder 4 S had righted itself and was in its proper position within a small fraction of an inch. The deviation of the other three cylinders from the exact location was also negligible.

The top ends of the tower piers and the connecting transverse strut are of monolithic construction, but the longitudinal struts between the cylinders were placed later, the ends resting in niches left for that purpose.

The concrete mixing plant was located at the east end of the bridge. To facilitate the construction of the embankment at this end a pile trestle had been driven, and the spaces between the bents immediately behind the east abutment were utilized for a storage bin for broken stone and gravel. These aggregates were dumped directly from gondola cars into the bins. A house built of corrugated iron for the storage of cement adjoined the material bins, alongside the present low railroad tracks, so that the cement could be unloaded directly into the house.

A Smith mixer was located adjacent to the bins and track, the whole arrangement of the plant being admirable for quickly charging and discharging the mixer. For the transportation of the mixed concrete, small cars were used, running on a 2-ft. gage track and laid parallel to the present westbound railroad track, extending to about the middle of the river. The cars on this narrow gage line were operated by an endless cable, with a hoisting engine stationed near the mixer. At the end the concrete was handled by a derrick into the west pier and abutment. The concrete for the cylinder piers was handled by the locomotive crane, which was used for excavating the material from within the cylinder piers.

Below the ground level the concrete was made of 1 part Portland cement and 5 parts of Niagara river sand and gravel, natural mixture. Above the ground level the mix was 1 part Portland cement, 2 parts sand and 5 parts broken stone.

Simultaneous with the construction of the new lift bridge work was undertaken on the elimination of the grade crossing of the New York, Chicago & St. Louis, the Pennsylvania and the Buffalo Creek railroads. The crossing consists of two main double track through spans over the several railroads mentioned,

each composed of three plate girders, 106 ft. long center to center and one shorter span, 30 ft. in the clear, over a private road to the works of the Contact Process Company.

This section of work extends from the overhead crossing of the Lake Shore & Michigan Southern easterly to the overhead crossing of Abbott road, a distance of 1.4 miles. The elimination of this crossing required the elevation of what is known as the Nickel Plate interchange yard, where all the freight and passenger traffic between the Lackawanna and Nickel Plate is interchanged.

The contractor for the substructure was Walter H. Gahagan, Inc., Brooklyn, N. Y., and the piledriving was done under a subcontract by the D. E. Horton Construction Company, Buffalo, N. Y. The Strauss bascule bridge superstructure was fabricated and erected by the Pennsylvania Steel Company, Steelton, Pa. The grade elimination work was all done by the Lackawanna Railroad Company's own forces. All of the work is being done under the direction of G. J. Ray, chief engineer, Delaware, Lackawanna & Western, under the immediate supervision of A. E. Deal, bridge engineer, and George E. Boyd, division engineer.

AN AUTOMATIC FREIGHT TRUCK COUPLER

The success of power trucking in freight houses is dependent largely on the perfection of the details of operation and the elimination of lost motion wherever possible. This has led to the development of an automatic coupler for freight trucks by Edward Fitzgerald, general foreman of the Twelfth street freight house of the Chicago & Eastern Illinois, at Chicago.

As shown in the photographs this coupler consists of a yoke on the forward end of the truck, consisting of a $\frac{3}{4}$ -in. round rod bent in the shape of a U and slightly pointed in the middle of the loop to form a groove. The device on the rear of the truck consists of a malleable-iron fork equipped with a trigger suspended from the upper arm and seated against a projection on the lower arm to keep it from swinging backwards while



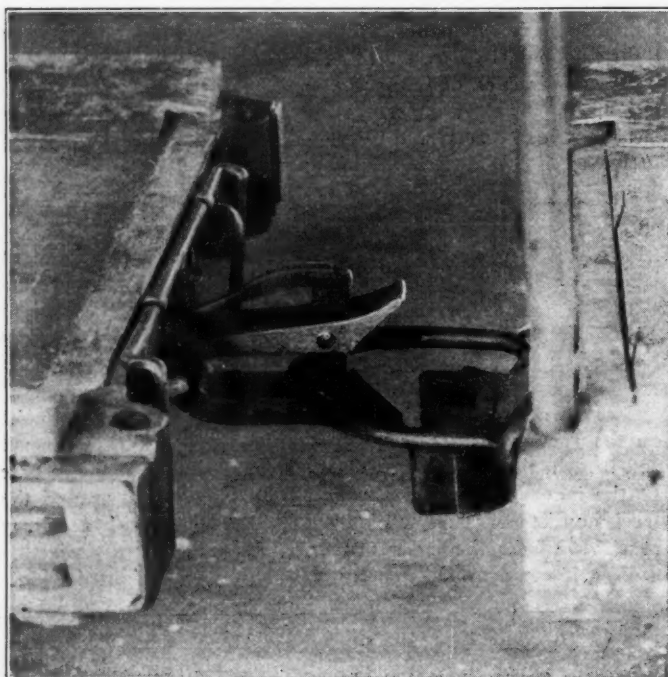
Automatic Coupler—Cars Separated

allowing it to swing freely forward. In operation, as the trucks are brought together, the yoke on the front of the rear truck comes in contact with the trigger in the fork on the rear of the forward truck, which it swings forward, allowing the yoke to enter the fork. As the yoke passes the trigger the latter drops back into place, locking the two trucks together. The point of the yoke cannot come in contact with the base of the fork because the point of the lower arm of the fork strikes a U-shaped bumper located on the forward end of the rear truck

just under the yoke. A hand lever similar to that on standard M. C. B. couplers raises the trigger and permits the release of the yoke to disconnect the trucks. On the motor car a cord attached to the hand lever enables the motorman to uncouple his car without leaving his position.

The principal advantage of the device is that the trucks may be coupled without requiring that they be accurately centered and alined. A reasonable variation is allowed by the spread of the yoke which is $7\frac{1}{4}$ in., and the spread of the bumper which is $4\frac{1}{2}$ in. After the trucks are coupled, they are lined up by the trigger as it slips along the yoke until it reaches the groove at the point.

Any difference in elevation of two trucks is adjusted by means of the $5\frac{1}{4}$ -in. vertical spread of the fork. The inclined faces



Automatic Coupler—Cars Coupled

on the ends of the fork serve to deflect the yoke upward or downward into the slot. The yoke is pivoted on two eye-bolts attached to the truck sill and has an extension which bears against a pivoted counterweight attached under the truck. By means of this the yoke is normally held in a level position, but may be deflected up or down with variations in the relative elevation of the two adjoining trucks.

These couplings have been in use about two months in the outbound freight house of the Chicago & Eastern Illinois at Chicago on 125 four-wheeled trucks with 3-ft. by 6-ft. platforms and three motor trucks. The cars are ordinarily handled in trains of three to seven trailers each, over a trucking length of about 1,700 ft. The motor car operators very quickly developed skill in handling the couplers, which have materially increased the efficiency of the trucking. The couplers are manufactured by Guilford S. Wood, Chicago.

RAIL SHIPMENTS FROM THE UNITED KINGDOM.—The shipments of rails from the United Kingdom have necessarily been much reduced by the great European war. They showed, however, rather more strength in July. The exports for that month came out at 33,224 tons, as compared with 43,133 tons in July, 1914, and 53,570 tons in July, 1913. The aggregate exports to July 31, this year, were 157,190 tons, as compared with 303,991 tons and 308,185 tons. The United Kingdom has been sending scarcely any rails this year to the Argentine Republic, the shipments to that country to July 31, having been only 569 tons, as compared with 20,823 tons and 32,602 tons in the corresponding period in the preceding years.—*Engineering, London.*

FRENCH RAILROAD EXCURSIONS IN WAR TIME

BY WALTER S. HIATT*

One of the curious aspects of the war in France is the effort of the railroads to encourage the customary tourist and excursion travel of peace times. While the number of American tourists is limited this year, because of the ungrounded fear of traveling in a country at war, there are a good many English tourists. It is common to see notices in the newspapers and elsewhere. "Welcome to France," stating that behind the armies France works and lives as usual. The Touring Club of France, the Automobile Club of France, the hotel associations, together with the railroads, are issuing their customary booklets. That of the Touring Club was printed in English and 300,000 copies sent broadcast. Much of this work is useless, however, as addressed to the American public, which certainly will not venture abroad until peace comes; and then there will not be enough ships to accommodate the people who will flock to see the new ruins of Europe.

Domestic France is traveling, not in the customary numbers, but nevertheless in surprising numbers to take the usual summer rest away from home. The French man and woman work hard the year around; employees work their ten and twelve hours a day, and this past year has been such a nerve-racking one for all that the needed rest is being taken whenever possible. It is not the lack of money that is preventing those not engaged in army work from going, so much as the short-handed conditions that prevail everywhere.

The travel is taking the direction opposite to the trench country, for two reasons: First, the army regulations prevent free movement in the so-called army zone to the north and east of Paris, and the traveler must have a pass before he can buy his ticket. Then public opinion is strong against idle visitors to any part of the country where so many thousands of Frenchmen have lost their lives. Recently a party of French excursionists took an automobile in Paris and rode out beyond Meaux, where the fighting was severe during the battle of the Marne. At the present time trenches are being perfected all through that region, as a precautionary measure, and when an army captain spied the party of visitors he stopped it and asked why they had come there. One of the men of the party explained the reason. "Very well, I'll give you a chance to see what a trench is like," said the captain, with pleasant irony. "Get down, every man of you, and dig." The men of the party were thus forced to dig all through a hot afternoon, and when night came they were permitted to go home. "Now you can say that you have done something for France, and I hope you will go home better Frenchmen," the captain told them sternly.

There are two interesting features of French railroad travel that are not familiar to the American manner of encouraging excursionists and travelers. One is the so-called family ticket, issued as usual this year. A family of three may get reduced rates that cut the usual rates in half, and a family of five may travel at 40 per cent of the ordinary rate. The father of the family, in buying the ticket, if he desires, may arrange to travel, going and coming, at a different time from the other members of his family. In addition, any member of the family may go and come at any time at half fare between the points named on the ticket if at the time the original family ticket is purchased an identification card is asked for.

The second feature adopted in France to encourage travel is the organization of an automobile service by the railroad at points of interest, by which the traveler can see readily and cheaply the country adjacent to the railroad. For instance, the Southern Railroad (chemin du fer du Midi), which operates in that part of France lying next to Spain and connects the Atlantic ocean with the Mediterranean sea, has begun the organization of such automobile service. It has this service at the springs of Biarritz, in the gorges of the Tarn river, and elsewhere. Despite the war this service is running this year.

Still another feature of French tourist travel is the existence

*Our Special European Correspondent.

all over France of narrow-gage railroads that run where it would not pay a broad-gage road to go, or else where broad-gage roads could not be built except at heavy expense. These railroads, known as the "Economiques," act as feeders to the large railway systems in that they bring travel and freight to them from out-of-the-way districts.

SUPERHEATER LOCOMOTIVES AND GRADE REVISION

BY PAUL M. LA BACH

Assistant Engineer, Chicago, Rock Island & Pacific, Chicago, Ill.

In these days of tight finances probably more schemes are investigated with the idea of saving money than at any other time. Many projects also, which would have shown a profit a few years ago, will not pay under the present revision downward of freight and passenger rates by railroad commissions. The idea is best expressed by the formula:

$$\frac{R - E}{C} = p$$

Where R = annual revenues from operation.
E = annual operating expense (including depreciation and taxes).
C = cost of construction.
p = per cent of profit.

It is evident that if R is decreased and E is increased at the same time, the profits expressed in percentages will decrease very rapidly. This is exactly what has been going on for a number of years. The revenues from operation have been cut down by the reduction of rates, while the cost of operation has been increased by full crew laws, taxes, special equipment, etc. It becomes necessary, therefore, to fix the value of p before making any investigation as to anticipated profits. A term of years of interest rates should be used and not the low rate which has been prevalent for some time. To this should be added promotion fees, discounts, etc., which decrease the amount actually received.

One writer, who has been feeling pessimistic about the outlook, said, not long ago, that it did not pay to make any improvements of any kind because a commission of some sort or an extra crew law would rise up and take the profits away as soon as they were earned. When one sees a public official urged to get a public appropriation for an uneconomic improvement, in order that the money may be spent in his district, and at the same time exhorted to secure the reduction of rates or the passage of bills that will increase operating expenses, when a safe margin between R and E would cause a much greater expenditure for improvements in the same district, the situation can hardly be said to possess much logic. This is a condition and not a theory, and has resulted in a state of affairs such that paying improvements cannot be made on light traffic lines. If railroad building were now in its infancy it is probable that 25 per cent. of the steam lines now constructed would never be built with present returns contemplated. On lines with heavy traffic many improvements may still be made that will show a profit. The medium traffic lines are the ones that present the most difficult problems, as a misconception of the method of operation may cause an assumption which is not justified by the facts and operation under the new conditions will not show sufficient profits to justify the expense of changes. For this reason 6 per cent. is chosen as the interest rate.

A thorough understanding of the present working conditions is essential. It may be found that although a change in grade alone might not effect a sufficient saving, when a superheater is added to the locomotives in use, then a saving will be made. To illustrate this point the profile in Fig. 1 will be assumed. The length of the engine district is such that the rating of the locomotive is dependent on time rather than on distance. The 16-hour law makes it imperative to reach the destination in that time. The engine crew will draw the same amount of wages in any event, as the men have their choice between payment by hours or by miles. Passenger trains will not be affected by a change in the grade line except as they may make faster time. On a short line they might add a car, but on a long line between two important

points they would not be able to do so, as competition governs the time. The same is true of time freight. No addition in train load is to be expected. This will narrow the tonnage affected down to the slow freight, which we will assume is handled by Consolidation engines in this case.

The method adopted by the American Railway Engineering Association, and published in its Manual for 1911, has been used for calculating the draw-bar pull of this locomotive. Without going into details* the results are given in Table I, which shows the drawbar-pull of this locomotive on a level grade for different speeds. It will be noted that the fuel used has a heat value of 11,000 B. T. U., and that 4,000 lb. per hr. is taken as the capacity of the fireman. With the present method of operation each slow freight loses 3 hrs. at meeting and passing points, waiting for orders and taking coal and water. Allowing one hour for emergencies this would make the maximum running time allowable 12 hrs. This is for summer conditions. Train resistance for 32.5-ton cars, which is about the average car weight in the Mississippi Valley, is taken at 5.4 lb. per ton at speeds of 4 m. p. h. to 30 m. p. h., which is believed to be a fair average. An inspection of the profile shows that the hardest work must be performed and that the longest time will be needed for westbound trains on account of the greater rise in that direction. While for very accurate work a speed curve should be calculated from acceleration tables, this will be omitted in this case, as the profile will make it unnecessary. The 4 hr. delayed time given includes the time needed to decrease from rated speed to a stop and from a stop to the rated speed for those points where this must be taken into account. The train will therefore be treated as though when rated properly it will travel at uniform speeds on the different sections of the profile.

TABLE I

Drawbar-Pull of Saturated Steam Locomotive, Consolidation Type.			
M. P. H.	Lbs.	M. P. H.	Lbs.
0	38,980	18	14,985
1	38,512	19	14,082
2	38,043	20	13,179
3	37,574	21	12,334
4	37,104	22	11,561
5	36,634	23	10,869
6	33,328	24	10,197
7	30,567	25	9,617
8	28,259	26	9,074
9	26,324	27	8,565
10	24,669	28	8,103
11	23,221	29	7,687
12	21,870	30	7,298
13	20,577	31	6,932
14	19,345	32	6,584
15	18,168	33	6,256
16	17,041	34	5,954
17	15,992	35	5,672

Grate area, 50 sq. ft.
Heating surface, 3,318 sq. ft.
Diameter wheels, 63 in.
Steam pressure, 200 lb.
Coal consumption, 4,000 lb. per hour (while working steam).
Coal at 11,000 B.t.u.
Cylinders, 22 in. by 30 in.
Weight locomotive and tender with coal and water, 172 tons.

For a saturated steam Consolidation locomotive (see Table I) the drawbar pull at 5 m. p. h. will be 36,634 lb. At 5 m. p. h. on a 0.5 per cent. grade the rating will be found as follows:

$$10 \text{ lb. grade resistance} + 5.4 \text{ lb. train resist.}$$

$$= 36,634 - [10 \times 172 \text{ tons (wt. of eng.)}]$$

$$= 2267 \text{ gross tons, including the caboose.}$$

The resistance of this load on a level grade will be 2,267 x 5.4 = 12,242 lb. By consulting Table I this is about equal to the drawbar-pull at 21 m. p. h. For a train moving westward the following schedule will be had when 35 m. p. h. is the maximum speed:

15 miles at 21 m.p.h.	= 0.71 hours
20 miles at 35 m.p.h.	= .57 hours.
60 miles at 21 m.p.h.	= 2.86 hours.
25 miles at 5 m.p.h.	= 5.00 hours.
40 miles at 21 m.p.h.	= 1.90 hours.

Total.....11.04 hours.

* The calculation of tables of acceleration and retardation for use in plotting speed curves showing train movement is treated in "Tables for Finding Proper Tonnage Rating" by the author in *Railway Age Gazette*, August 23, 1912.

As the total is below the 12-hour limit set and the speed is only 5 m. p. h. on the adverse grade, it is apparent that there are only two ways of increasing the train load. Either reduce the grade or get more efficient engines. The profile in Fig. 2 is known to be possible from a topographical point of view; the dotted lines indicate the changes.

The following is the rating of the locomotive on a 0.3 per cent. grade at 7 m. p. h.:

$$\frac{30,567 - (6 \times 172 \text{ tons})}{6 + 5.4} = 2,590 \text{ tons}$$

The train resistance on a level grade will be $2,590 \times 5.40 = 13,986$. This is equal to the drawbar-pull at 19.1 m. p. h. This would provide the following:

42 miles at 7 m.p.h.	= 6.00 hours
33 miles at 35 m.p.h.	= .94 hours
95 miles at 19.1 m.p.h.	= 4.98 hours
Total	11.92 hours

The time necessary to haul this load is just inside the limit set. The increase in tons per train due to the change in grade will be $2,590 - 2,267 = 323$ tons when the element of time over the division is considered.

Within the last few years the locomotive superheater has come into general use on new locomotives. These superheaters can also be applied to the saturated steam locomotives already in use.

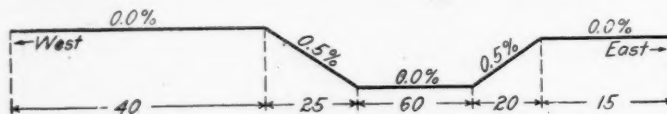


Fig. 1—Assumed Profile Before Revision of Grade

The Pennsylvania Railroad has made numerous tests of superheaters at the Altoona testing plant, and the report of the subcommittee on Stokers and Superheaters of the committee on the Economics of Railway Location of the American Railway Engineering Association* makes this information available for use when the heating value of the coal, hourly coal consumption and heating surface are known. This makes it possible to calculate the additional tonnage which one of the saturated steam locomotives, given above, would haul if equipped with a superheater. Table II gives the resulting drawbar-pull for parallel conditions of coal consumption, heating value of coal and heating surface of boiler. If Table II is used in the same manner as Table I, then,

TABLE II. Drawbar-pull of Superheated Steam Locomotive, Consolidation Type.			
M. P. H.	Pounds.	M. P. H.	Pounds.
0	39,071	18	18,750
1	38,778	19	17,919
2	38,484	20	17,087
3	38,190	21	16,392
4	37,895	22	15,695
5	37,600	23	15,102
6	37,304	24	14,507
7	37,008	25	13,947
8	36,711	26	13,388
9	36,412	27	12,909
10	36,113	28	12,428
11	35,814	29	12,014
12	35,515	30	11,608
13	35,216	31	11,218
14	34,917	32	10,840
15	34,618	33	10,500
16	34,319	34	10,169
17	34,020	35	9,841

This locomotive is the same as shown in Table I, with the exception that it has been equipped with a superheater.

for the 0.3 per cent. grade, the rating of the superheater locomotive at 7 m. p. h. would be:

$$\frac{37,008 - (6 \times 172)}{6 + 5.4} = 3,155 \text{ tons.}$$

The resistance of this tonnage on a level would be $3,155 \text{ tons} \times 5.4 = 17,037 \text{ lb.}$, or the drawbar-pull of the superheater locomotive at 20 m. p. h., making a schedule as follows:

42 miles at 7 m.p.h.	= 6.00 hours.
33 miles at 35 m.p.h.	= .94 hours.
95 miles at 20 m.p.h.	= 4.75 hours.
Total	11.69 hours.

* American Railway Engineering Association's December, 1914, Bulletin, page 135.

By a similar process the tonnage rating (including the caboose) of the superheater locomotive on the 0.5 per cent. grade at 5 m. p. h. would be:

$$\frac{10 + 5.4}{37,600 - (10 \times 172)} = 2,329 \text{ tons.}$$

The drawbar-pull on a level grade would be $2,329 \times 5.4 = 12,577 \text{ lb.}$, which could be maintained at 27 m. p. h. This would give the following schedule:

25 miles at 5 m.p.h.	= 5.00 hours.
25 miles at 35 m.p.h.	= .57 hours.
115 miles at 27.7 m.p.h.	= 4.15 hours.
Total	9.72 hours.

The last case shows a considerable advantage in time, but as the loading on the adverse grade reduces the speed to as low a point as could be considered feasible, there will be no method of increasing the size of a given train. Subtracting the weight of the caboose, the following results are obtained:

	Rated tonnage on		Increase tons.
	0.5 per cent gradient.	0.3 per cent gradient.	
Saturated steam locomotive.....	(A) 2249	(B) 2572	323
Superheater steam locomotive....	(C) 2311	(D) 3137	826

	Time, hours		
	Delays	Working steam.	Drifting.
Saturated locomotive—			
(A) on 0.5 per cent grade.....	4.0	10.47	.57
(B) on 0.3 per cent grade.....	4.0	10.98	.94
Superheater locomotive—			
(C) on 0.5 per cent grade.....	4.0	9.15	.57
(D) on 0.3 per cent grade.....	4.0	10.75	.94

The savings or increases will be in fuel, train wages due to difference in the total engine mileage and caboose mileage and the release of locomotives. For this case the cost of the fuel will be considered at \$2 per ton and the following rates of combustion will be used:

4,000 lb. used per hour while working steam.
1,500 lb. firing up each trip.
400 lb. per hour while standing still.
700 lb. per hour while drifting.

A gross slow freight tonnage of 7,500,000 tons per year in each direction will also be assumed. This will give the following train miles for each case:

A	6,666 trains x 160 miles = 1,066,560 train miles.
B	5,832 trains x 160 miles = 933,120 train miles.
C	6,525 trains x 160 miles = 1,044,000 train miles.
D	4,782 trains x 160 miles = 765,120 train miles.

Figuring that the road engineers and firemen will average 10.1 cents per engine mile, and the trainmen 11.9 cents per engine mile,

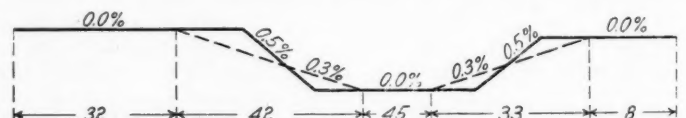


Fig. 2—Assumed Profile After Revision of Grade

the differences in enginemen's and trainmen's wages per year will be:

	Saving in Miles.	Saving in Wages.
A-B.....	133,440	\$29,356
A-C.....	22,560	4,963
A-D.....	301,440	66,316
B-D.....	168,000	36,960
C-D.....	278,880	61,353

The cost of fuel per year for case A will be, \$302,504; for case B, \$278,070; for case C, \$260,249, and for case D, \$223,605. The difference in the cost of fuel and supplies will be:

	Fuel.	Water, Oil and Supplies.	Total.
A-B.....	\$24,434	\$1,879	\$26,313
A-C.....	42,255	3,143	45,398
A-D.....	78,899	6,069	84,968
B-D.....	54,465	4,189	58,654
C-D.....	36,644	2,926	39,570

There will be 18.3 locomotives required to handle the business as outlined in case A, 15.9 in case B, 17.8 in case C, and 13.1 in case D. The saving in the cost of the locomotives and their interest and maintenance charges will be as follows:

No. Loco- motives Released.	Cost.	Interest 6 Per Cent. Depreciation 5 Per Cent.	Repairs \$0.09 Engine Mile.	Depreciation and Repairs.
A-B..... 2.4	\$36,000	\$3,960	\$12,010	\$15,970
A-C..... .5	7,500	825	203	1,028
A-D..... 5.2	78,000	8,580	27,130	35,710
B-D..... 2.8	42,000	4,620	15,120	19,740
C-D..... 4.7	70,500	7,755	25,099	32,854

The following recapitulation shows the actual saving of one case over the other:

Trains.	Train Wages.	Fuel, Water and Supplies.	Release of Locomotives.	Total.	Totals Capitalized at 6 Per Cent.
A-B.....	\$29,356	\$26,313	\$15,970	\$71,639	\$1,193,983
A-C.....	4,963	45,398	1,028	51,389	856,483
A-D.....	66,316	84,968	35,710	186,994	3,116,566
B-D.....	36,960	58,654	19,740	115,354	1,922,566
C-D.....	61,353	39,570	32,854	133,777	2,229,616

The estimated cost of building the line with the 0.3 per cent. grade is taken at \$41,000 per mile, or \$3,075,000. The capitalization amounts in the above table show that the expenditure of \$3,075,000 would not be justified if the same saturated steam locomotives are to be used, as the capitalized saving (A-B) of \$1,193,983 is much less. The only one of these capitalized savings in excess of the construction cost is (A-D). That is, if the grade is reduced to 0.3 per cent. and superheaters are added to the locomotives, at a cost not to exceed \$2,000 each, the improvement will be justified.

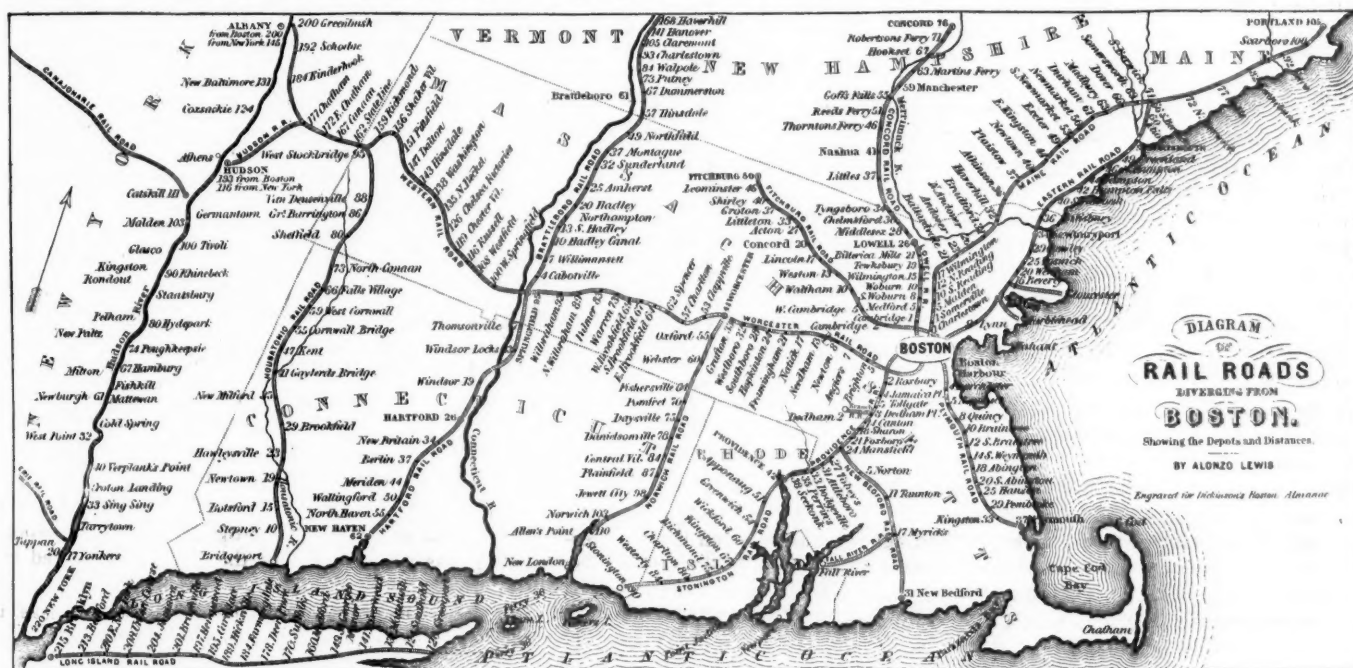
The largest return on the outlay will be found in (A-C), as nothing will be required except the expense necessary to equip the engines with superheaters. The savings will be largely in fuel per ton-mile, although a small saving is made in the other items. The expenditure needed to make these alterations should not exceed \$40,000. The designers of superheater locomotives have the choice of using the additional power by increasing the size of cylinders and getting a larger drawbar-pull at low speeds,

NEW ENGLAND RAILROADS IN 1845

The accompanying map is a reproduction of one which appeared in Dickinson's Boston Almanac, showing the railroads diverging from Boston, as they were in the year 1845. At that time there was no through rail route between Boston and New York, the nearest approach to this being the Boston & Providence and the Stonington railroads from Boston to Stonington and thence by ferry 30 miles to the eastern terminus of the Long Island Road at Greenport. It does not appear, however, that this route was much patronized. Steamers from Stonington direct to New York were popular for some years prior to 1845.

The names of the railroads on the map show that the editor of the almanac did not take much pains to acquaint himself with the official titles. What he calls the Maine Railroad then, as now, went by the name of "Boston & Maine." The Worcester Railroad was the Boston & Worcester, and the Hartford Railroad was the Hartford & New Haven. The Lowell was the Boston & Lowell and the Norwich was the Norwich & Worcester.

The line which is shown as the "Brattleboro Railroad" was never built, if, indeed, any line was ever proposed over the route here shown. The railroad from Springfield northward lies on the west side of the Connecticut river. It was opened to Greenfield in 1845, and four years later to the Vermont



Railways in New England in 1845

provided the weight on drivers permit, or using the same cylinders and getting greater efficiency at higher speeds.

It may be argued that the profile is not typical. There cannot be a typical layout for guidance in all cases. The speed over a profile depends upon the percentage of down, level and adverse grades. The adverse grade in this case is only about 25 per cent of the distance and may be found in many cases where engine districts are a succession of up and down maximum grades. The well known fact that superheater locomotives are more efficient at higher speeds than the saturated steam would seem to indicate that this fact should be taken advantage of especially when the district involved is a long one.

SOUTH AFRICAN RAILWAY RECORD.—The reconstruction of the railway establishing the Union gage in what was formerly German Southwest Africa, is now completed between Walfish Bay and the Union. The last section of 32 miles was accomplished in 50 hours, constituting a new South African record.

line. The "Hudson Railroad" was the Hudson & Boston, which was owned in the interest of the Western Railroad, now the Boston & Albany. Between New York and Albany the water route, in 1845, had everything its own way.

The two names most familiar on this map are those in the extreme margins, the Long Island and the Erie; but the Long Island alone is the only name in the whole list which still survives, both as an owner, and as operating its own line; for the Erie which existed in 1845 died and was long since buried. The present Erie might be called, perhaps, the grandchild of the original Erie.

The total mileage shown on the map is apparently the total railroad mileage in the States of Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire and Maine, and on Long Island. Leaving aside the railroads shown in New York, there is a total mileage on the map of 1,120. In these same States and Long Island to-day the total length of railroads is 8,472 miles, much of it, of course, double-track and a considerable proportion four-track road.

SHOWING THE TRAIN NUMBER ON THE ENGINE

By W. E. WATTS

Train Dispatcher, Atchison, Topeka & Santa Fe, Raton, N. M.

The use of indicators on locomotives showing the designation of the train is a practice that should be more widely adopted. The standard code of train rules provides that "Regular trains will be designated in train orders by their number . . . adding engine numbers if desired." A large number of railroads do use engine numbers in train orders, while an equally large number do not. Very few of those roads using engine numbers have made any special provision for illumination of the engine number by night, outside of placing the number in the headlight. On some lines this is shown across the face of the headlight; on others in small spaces provided for that purpose on each side of the headlight. On yet others the number is not illuminated at night in any manner whatsoever, and at stations it is often necessary for the engineman or fireman to hold a light so it will shine on the number on the side of the cab or the tank.

The train indicator has been generally adopted by the Union Pacific and the Southern Pacific with great success. They use the indicators as an additional means of identification of a train, as the dispatchers also incorporate engine numbers in train orders when possible.

These indicators are arranged to show six figures, e. g. 401 or 2-155 or X-1705. These letters and figures are about six inches high and three inches wide, white against a black background and illuminated by a small electric light connected with the cab circuit. On some portions of these systems acetylene or oil is used with good results, but the electric light is best. These numbers are also a useful means of identification in the day time.

Some officers have advanced the objection, "what about the indication getting clogged up with snow and ice in the winter time?" Very little trouble has been experienced from this cause. The indicators are usually placed in a horizontal angle of 45 degrees, and neither snow nor sleet will stick to the face of the indicators as would be the case if they were placed broadside towards the front. Even if there is a little interference from snow and sleet at times, it is less than that which actually occurs every winter season now in that respect as regards obscuring the numbers in the headlight.

Quite often in present practice it is necessary to use the form "Eng unknown" in train orders, when the engine number is not known at the time the order is placed, as a good many train and engine men will refuse to accept an order unless the number is shown or this form is used. This, of course, where the rules require numbers to be given. And again, quite often it is necessary, for some cause or other, to change engines on a train which is all ready to depart, and it is then necessary to inform all trains concerned that "No. 1 has Eng. 1 instead of Eng. 2," or "Orders Nos. — should read Eng. 1 instead of Eng. 2," etc. If indicators showing train numbers were used on all locomotives thus used, engine numbers would be unnecessary. It is but a moment's work to change the display of an indication to any other designation.

From the standpoint of "safety first" the indicator is a valuable asset. There are numerous contingencies whereby one train may mistake another train for something else than what it is, as all railroad men well know. But with the indicator there is very little chance for doubt or mistake. The number of the train is shown in good sized figures, much larger than the usual headlight number, and when properly placed, these indicators are much more easily "picked up" by the crew on another train, whether standing or moving, than are the engine numbers as usually displayed.

Nowadays, when it is the practice to run several trains in the same direction closely following each other, and the equipment of one looks practically the same as that on the others, a crew in the siding for 1, 3 and 7 cannot know which is which, if they are on time, or nearly so (the train in the siding having no orders regarding them which would give the engine numbers), and if No. 7 comes first it may be taken for No. 1, etc. If they all come

along carrying no signals the train in the siding may proceed, but if one should be carrying green signals the man in the siding does not know who's who, and there is some little confusion.

It is true that those roads which do not require the use of engine numbers get along very well, but the indicator, I reiterate, is a strong factor in "safety first."

RAPID-FIRE REGULATION

The Cincinnati Enquirer quotes J. M. Davis, general manager of the Baltimore & Ohio Southwestern, in the following interview on the vexations of regulation, given just after a long session with the road's legal department:

"Every railroad officer who looks at the matter of public relations in a broad-minded way agrees that regulation has been beneficial up to a certain point. The law prohibiting rebates which undermined commercial concerns, the law to protect railroad employees by means of safety appliances, the anti-pass law and numerous others have helped us serve the people better and enabled the public and the carriers to understand the rights of each other. So I say that, considered from this viewpoint, the railroad officials do not and would not return to the methods of the old days.

"But while the laws which I have mentioned have been placed on the statute books, the way has been smooth for the demagogues and the unscrupulous, who have taken advantage of their opportunities to harass the railroads with laws which not only were unjust, but which saddled large expense upon them without benefit to the public or the service.

"In an address before the American Bar Association, Senator Elihu Root, of New York, decried the indiscriminate passing of laws and stated that this country makes too many laws. The speaker said that 62,000 statutes had been passed in five years and a big percentage of these affected the railroads.

"These new laws are being written on the statute books so rapidly that an attorney is often unable to give counsel promptly because of being unable to keep up with the pace of the legislatures.

"Of the more important laws pertaining to the railroads which we have with us always are the hours of service law, employers' liability, ashpan laws, caboose, full crew and semi-monthly payroll statutes, two-cent rate, electric headlight, automatic block signal, train limit and automatic fire-door laws. One legislature had up for consideration last year a bill to compel the railroads to provide air-tight and dust-proof locomotive cabs—about as practicable as the bill introduced in Colorado to compel bulls when traveling alone at night on the public highways to wear lanterns and the bill in Kansas to revise the Ten Commandments. I have in mind conflicting laws of states which the railroads are required to comply with. One of these states requires a cuspidor between every two seats in passenger coaches, while the adjoining state through which the trains travel on the same run requires that the cuspidors be removed.

"The safety appliance law has been a great help to the railroads, but with the changes which have been made and the modifications which have taken place and continue it is difficult to carry out the provisions. At a recent staff meeting the question was asked whether anyone present could name the parts of a car subject to defect, and it could not be done, because there are 257 defective possibilities on a passenger or freight car and 30 on a locomotive."

TASMANIA COAL.—There are abundant seams of marketable coal in Tasmania. They belong to the permo-carboniferous and mesozoic measures, and range from 20 in. to 12 ft. in thickness. In the basin of the Mersey the seams belong to the older measures. In the eastern part of the island those of younger age prevail. Eleven collieries are now engaged in producing coal in Tasmania. The output in 1910 was 82,445 tons, valued at \$250,000.

Traveling Engineers' Association Convention

Report of the Proceedings Covering the First Two Days' Sessions, Held on Tuesday and Wednesday of This Week

The twenty-third annual convention of the Traveling Engineers' Association was held in Chicago, September 7-10, J. C. Petty, of the Nashville, Chattanooga & St. Louis, presiding. The opening prayer was made by Bishop Fallows, after which the president made a brief address of welcome. He also directed special attention to the economies that may be obtained by the co-operation of the traveling engineers with the other departments of a railway.

As is customary at the meetings of this association several special addresses were included in the program, in addition to the committee reports and technical papers. For Tuesday and Wednesday these included addresses by C. H. Markham, president, Illinois Central; F. W. Brazier, superintendent rolling stock, New York Central Lines east of Buffalo, and Frank McManamy, chief inspector of locomotive boilers, Interstate Commerce Commission.

Mr. Markham took occasion to pay tribute to the courage, skill and intelligence of the engineer. He also spoke of the unfair attacks on railroads and the fact that there was entirely too much regulation. He urged unity of all railroad forces in the great movement toward securing a better understanding of railroad problems and better treatment of the railroads. He emphasized also the necessity of seeing that the internal relations of the railroads should be amicable, stating that a great strike that would stop all trains would be followed by government ownership.

Mr. Brazier sketched briefly the development of locomotives and cars in recent years. He mentioned several prominent railway men that had started their railway careers on the locomotive, calling attention to the opportunities of the traveling engineer for advancement.

Mr. McManamy spoke of the necessity of obtaining good intelligent men as firemen, and called attention to the necessity of keeping locomotives in safe and serviceable condition. Since the boiler inspection law has been in effect accidents causing injury have been reduced to 51 per cent; the number killed from these accidents has been reduced 86 per cent, and the injured 54 per cent. This also must indicate a reduction in engine failures. He spoke of the locomotive inspection rules as being designed to protect the enginemen from injury due to defective equipment.

SMOKE PREVENTION WITH OIL BURNING LOCOMOTIVES

The committee on smoke prevention confined its report this year to the consideration of oil burning locomotives with the purpose of determining whether or not this fuel can be used with less smoke than coal. From the report, and the discussion which followed, it is evident that as much and possibly more difficulty may be experienced in securing smokeless firing with oil burning than with coal fired locomotives.

The amount of smoke produced by an oil fired locomotive depends to a great extent on the condition of the locomotive and the way in which it is handled by the crew. Although little difficulty is experienced in firing stationary boilers with oil, there being a large furnace volume and a low pressure draft, the conditions on a locomotive are not such that smokeless firing can always be obtained readily. The variations in draft, due to the intermittent use of steam, especially in switching service, greatly aggravate the problem. When a locomotive boiler is forced it is practically impossible to eliminate smoke when oil is used as fuel, either because of insufficient air supply or the fact that the temperature cannot be raised sufficiently high to insure complete combustion. This is especially true when locomotives are fired up at terminals.

The oil should be preheated before it is delivered to the

burner in order that it may be thoroughly atomized; dry steam should be used in the burner as wet steam, caused by carrying the water too high in the boiler, will sometimes extinguish the flame entirely, causing explosions which damage the combustion arch. The consumption of oil should be carefully regulated, the fireman being careful to gage the oil supply with the working of the throttle. Ashpans should be as large as possible and air openings should be large enough to provide a plentiful supply of air for complete combustion with a minimum amount of draft. The brick work should be arranged to provide for an equal distribution of heat, and where this is done the brick arch can be used to good advantage. If smokeless firing is to be realized the engine must be carefully maintained and the firebox and tubes must be kept clean. The temperature of the firebox should be maintained as nearly constant as possible with the aid of dampers in order to prevent harmful effects to the various parts of the boiler because of sudden contraction and expansion.

TRAINING OF NEW MEN FOR FIREMEN

Nothing will so well repay the time and money spent as the education and development of railway employees in general and of locomotive firemen in particular. The locomotive firemen are using many million dollars' worth of coal, a great percentage of which is wasted through improper methods of firing and indifference to the fact that this coal represents so much money to the companies they work for.

Years ago when the number of men employed on one division was comparatively small, the fireman came into direct contact with the master mechanic and often with the superintendent of motive power. As a result the enginemen were more interested in the welfare of the company and took interest enough in their work to find out the correct methods to use in performing their different duties.

It is an admitted fact that the class of men employed as firemen during the past few years have not been up to the desired standard. Instead of enginemen working for the interest of the railways, we now find them promoting adverse legislation in every state. This legislation will cost, or has already cost, the railways much money in many ways. If the engineman could be made to see that his interest is directly connected with the welfare of the company that pays him, this condition would be eliminated.

We believe that the one thing which leads all others in causing this lack of interest, and oftentimes real opposition against the railways is the fact that in most cases the rank and file of the enginemen only know their superior officer through the chairman of the order to which they belong. The men and officials have grown apart until there is a great lack of confidence on both sides. Right here is where the traveling engineer can be of the greatest help in regaining this lost confidence, if he has the proper backing.

Every company should have a distinct policy regarding the education and development of firemen from the day they are employed until they have passed all examinations to make them full-fledged engineers. This system should be as clean cut and as vigorously maintained as the best of other operating systems are maintained. The new man should by all means have some special training before starting to fire a modern locomotive with its multitude of special appliances. He should be well grounded in the reasons for doing the work.

The work of educating the firemen should be placed in the hands of a broad-minded man who believes in this work, and is willing to give the best there is in him to it. He should have a practical knowledge of firing a locomotive and should thoroughly understand the burning of coal (or other fuel which may be

used) on the locomotive. He should have a general knowledge of all fuel used on the road and how it should be fired. He should have the knack of imparting his ideas to others on the locomotive or in class talks at terminals. Then, last, but not least, he should have the confidence of the officers of the road and be given full charge of the work, so that there will be no interference from any source.

Lesson papers should be prepared covering a course in elementary combustion, standard firing practice, boiler feeding, care of firebox on the road and at terminals, use of special equipment on the locomotive, rules and signals, instruction in safety first and locomotive running and breakdowns. Class instruction should be given at the different terminals. The class-room should be fitted with a portable moving picture outfit. Several roads now use the moving picture and speak very highly of it as an educational item of great value. A dummy firebox of standard size and shape, equipped with a brick arch so that the conditions will be the same as on the locomotive, should be used for giving practical instruction.

The employing of new men is very important and should be given the attention of some one capable of judging and handling men. We would suggest the type of man wanted as locomotive fireman as one who is twenty-one years old, with a bright, clean-cut appearance. It is necessary that he should have a common school education and be able to assimilate instruction. He should have good habits and if married so much the better. Such a man will repay any time spent on him if he has the right spirit. The prospective fireman should be given a position around the roundhouse in some capacity, such as wiper, mechanist helper, or on the cinder pit. If there are shops near or at the terminal, the new men can be placed there. With the men in the shops and in the roundhouse we will have them where we can start their education at once. There they will get experience which will be of great value to them after they get on the road as firemen and even after they go running.

When a man is employed he should be given a letter which will outline the position of the company with regard to his future. It will be explained to him that the company intends to educate him along the best lines of standard practice pertaining to his work; that if he will devote his time during working hours and some of his time out of working hours to the best interests of

the classes each day he should have been under the observation of some one who is interested to know if he is the right kind of man for the work. As soon as the new men are through the course in firing practice they should start on the locomotive running course. The traveling engineer should have charge of this work.

By following this system you first have picked men to start with. Then the company will have a chance to instill into their minds right thoughts about the position of locomotive fireman, and right thoughts about the position of the company toward the men. They will be ready to fire an engine from the start instead of probably never learning to fire. In the end it will give us a body of firemen on our locomotives who are interested in their work, who know how their work should be done, and who are looking forward to better positions on the road.

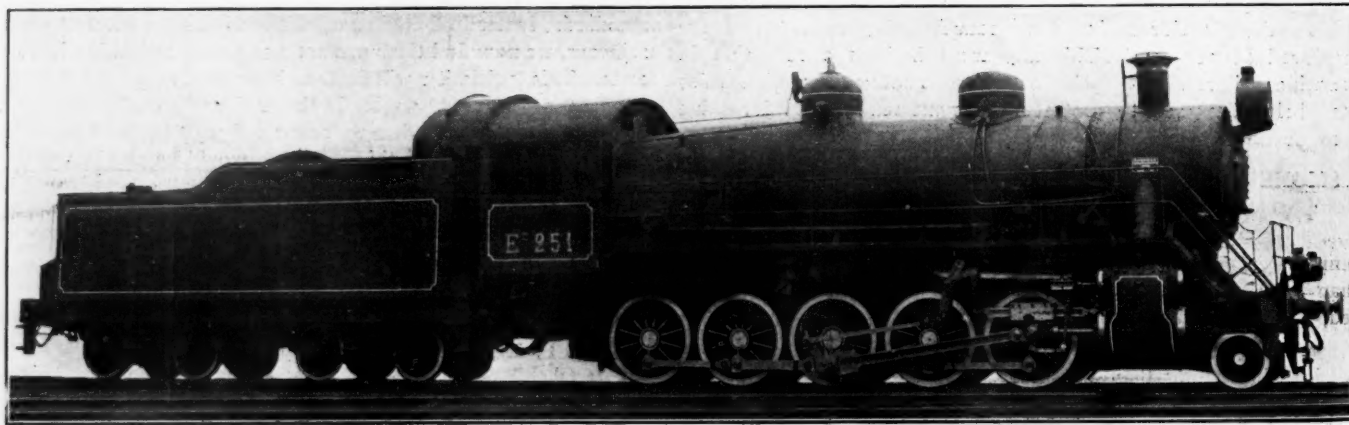
The report is signed by L. R. Pyle (M., St. P. & S. S. M.), chairman; J. C. Heyburn (St. L. & S. F.); J. C. McCutcheon (Wabash); J. Fred Jennings (M. C.), and W. H. Davies (Sou. Schools of Railway Science).

Discussion.—The presentation of the report was followed by an exhibition of moving pictures, as used by some of the roads in connection with instruction in firing. Martin Whelan laid particular stress on the necessity of making the enginemen feel that they are a very important part of the railway organization and that the officers have their best interests at heart. As a general thing the men do not appreciate the interest that is taken in them. A great deal more care should be taken in educating the enginemen, as with the changed conditions they do not now receive the benefit of individual instruction from a single engineer.

The closing sessions of the convention will be reported in next week's issue.

LOCOMOTIVES FOR THE RUSSIAN STATE RAILWAYS

Early in the summer it was announced in these columns that orders had been placed in America by the Russian State Railways for 400 locomotives of the Decapod type, 250 with the Baldwin Locomotive Works, 100 with the American Locomo-



Decapod Type Locomotive Built by the American Locomotive Company for Russian State Railways

the company, the latter will give him an education in everything pertaining to his work as a fireman and as a future engineer; that the company expects, as a reasonable return, that the man will give, first, loyalty to the company's interest in every way, striving to promote the welfare of the company whenever possible; then, that he will do his work energetically and according to instructions. If these things are kept before the new man from the beginning, always showing him that the company is taking an interest in him, we will be able to combat a great deal of the other influence at work among the men.

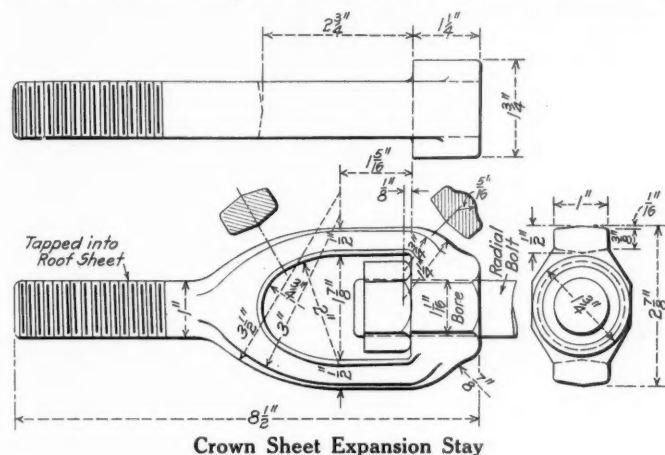
During the time this man has been in the shops and attending

tive Company, and 50 with the Canadian Locomotive Company. Apart from the magnitude of the order, these engines are of interest because of their design and the urgency with which they are being built. The orders were placed during the latter part of June, and the first of the locomotives were ready for shipment soon after the middle of August. During this time much of the designing was done, the engines were built and tested and then knocked down and packed for shipment.

The locomotives are designed for operation on track of 5 ft. gage, which is used on a large part of the mileage of the Russian State Railways. The axle loads are light as compared with

American practice, but the locomotives are of considerable capacity, the tractive effort being 51,500 lb. The ratio of adhesion, however, is unusually low. They are designed to haul 1,000 metric tons up a grade of .8 per cent at a speed of approximately 8 to 10 miles an hour, which they should readily do by working at a reasonably economical cut-off.

Although special materials and equipment have been used to a considerable extent in the construction of these locomotives,



the designs were prepared by the builders and the construction in each case is largely in accordance with the builders' practice. The illustrations show the engines built by the Baldwin Locomotive Works and the American Locomotive Company, and while many of the details of the two orders have been made interchangeable, it is apparent that few restrictions as to details were placed on the builders. The fuel used is an inferior grade of bituminous coal, and this is burned on a rocking and drop grate with an area of about 64½ sq. ft. The firebox is placed

screwed into the roof-sheet. The thread on the stay is set into the nut with a punch after the bolt has been adjusted to secure the proper tension. This arrangement has ample flexibility and utilizes ordinary staybolt taps in the boiler and firebox sheets, leaving the water space above the crown unobstructed.

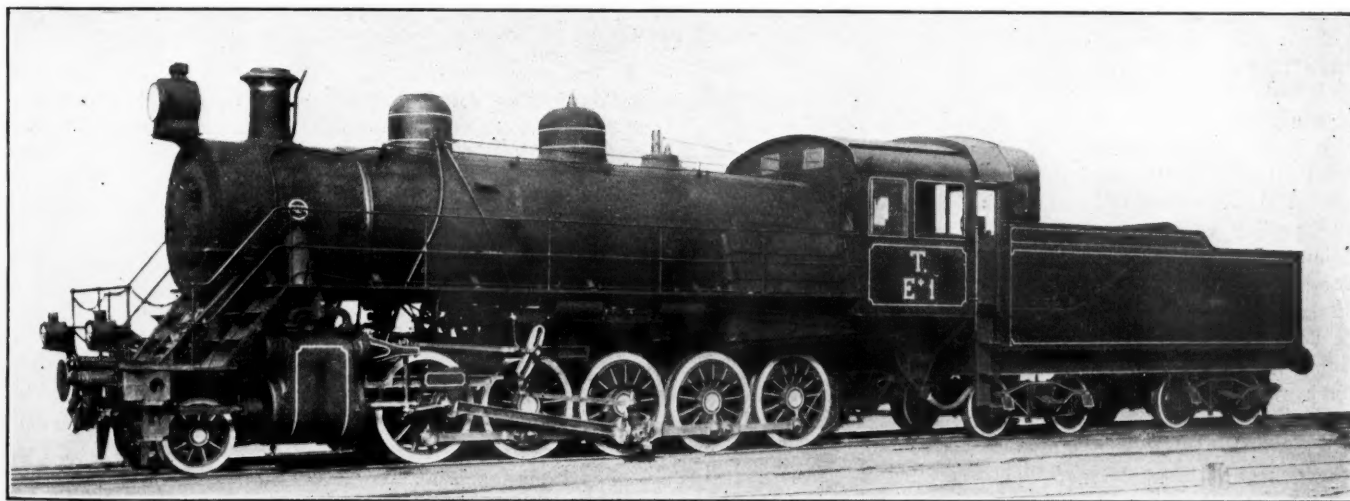
The locomotives are equipped with Schmidt superheaters and outside steam pipes. The superheaters have 28 elements, with a superheating surface of 563 sq. ft. in the Baldwin locomotive, and 553 sq. ft. in those built by the American Locomotive Company. Both orders have power reverse gears. The Baldwin engines are equipped with the Rushton reverse mechanism, which may be arranged without difficulty for manual operation. A screw reverse gear is applied to the engines built by the American Locomotive Company, the power reverse in both cases being operated by an air motor in the cab.

The cylinders, frames and running gear closely follow American practice in design. The pistons have rolled steel heads with cast iron rings sprung in, and are carried on extended piston rods. Single bar guides and crossheads are used, in accordance with Russian practice. The main driving wheels have plain tires which are necessary in order that the engines may traverse curves of 350 ft. radius.

The locomotives are fitted with wide running boards, in accordance with Russian practice, having railings around the outer edge. A railing is also applied across the front of the bumper. The cabs are of steel and the front end of the tender is enclosed to protect the engine crew from the weather. The couplers and bumpers are arranged in accordance with Russian practice, which follows that generally used in Europe. The locomotives are equipped with the Russian-Westinghouse automatic air brakes.

The tender is carried on two four-wheel trucks, which are of the arch-bar type, with rolled steel wheels. The frame is of longitudinal sill construction, the sills being of 12-in. channel section.

After being erected and tested by the builders, the locomotives



Freight Locomotive for the Russian State Railways Built by Baldwin Locomotive Works

above the driving wheels and is equipped with a security brick arch supported on water tubes. The boilers of the two designs are somewhat different. The Baldwin engine has a straight mud ring and is provided with an auxiliary dome for the safety valves and whistle. The ends of the mud ring of the American Locomotive Company's engine slope toward the longitudinal centerline, and the whistle and safety valves are placed directly on the main steam dome.

The inside fireboxes are of copper, and copper stays are used in the water legs. The front end of the firebox crown sheet of the Baldwin engines is supported by three rows of expansion stays of the type shown in the drawing. The nut on the upper end of the radial stay is seated in a die-forged stirrup, which is

are dismantled and packed for shipment, to be re-erected after delivery.

The principal dimensions of the locomotives are shown in the accompanying table:

GENERAL DATA		
	Baldwin Loco. Wks.	American Loco. Co.
Gage	5 ft.	5 ft.
Service	Freight	Freight
Fuel	Soft coal	Soft coal
Tractive effort	51,500 lb.	51,500 lb.
Weight in working order	196,000 lb.	195,300 lb.
Weight on drivers	175,000 lb.	174,600 lb.
Weight on leading truck	21,000 lb.	20,700 lb.
Weight of engine and tender in working order	328,000 lb.	330,600 lb.
Wheel base, driving	18 ft. 8 in.	18 ft. 8 in.
Wheel base, total	27 ft. 10 in.	27 ft. 10 in.
Wheel base, engine and tender	60 ft. 1½ in.	60 ft. 1 in.

RATIOS			
	Baldwin Loco. Wks.	American Loco. Co.	
Weight on drivers ÷ tractive effort.....	3.40	3.39	
Total weight ÷ tractive effort.....	3.80	3.78	
Tractive effort × diam. drivers ÷ equivalent heating surface*	.777	.784	
Equivalent heating surface* ÷ grate area.....	.53.4	.53	
CYLINDERS			
Kind	Simple	Simple	
Diameter and stroke.....	25 in. by 28 in.	25 in. by 28 in.	
VALVES			
Kind	Piston	Piston	
Diameter	12 in.	12 in.	
WHEELS			
Driving, diameter over tires	52 in.	52 in.	
Driving journals, main, diameter and length	10½ in. by 12 in.	10½ in. by 12 in.	
Driving journals, others, diameter and length	8½ in. by 12 in.	8½ in. by 12 in.	
BOILER			
Style	Straight	Straight	
Working pressure	180 lb. per sq. in.	180 lb. per sq. in.	
Outside diameter of first ring.....	70 in.	70¼ in.	
Firebox, length and width.....	108½ in. by 86 in.	107¾ in. by 85¾ in.	
Tubes, number and outside diameter.....	195—2 in.	195—2 in.	
Flues, number and outside diameter.....	28—5¾ in.	28—5¾ in.	
Tubes and flues, length.....	17 ft.	17 ft.	
Heating surface, tubes and flues.....	2,393 sq. ft.	2,386 sq. ft.	
Heating surface, firebox (including arch tubes)	208 sq. ft.	200 sq. ft.	
Heating surface, total	2,601 sq. ft.	2,586 sq. ft.	
Superheater heating surface.....	563 sq. ft.	553 sq. ft.	
Equivalent heating surface*.....	3,446 sq. ft.	3,416 sq. ft.	
Grate area	64.5 sq. ft.	64.4 sq. ft.	
TENDER			
Tank	Water bottom	Water bottom	
Frame	Channel	Channel	
Wheels, diameter	36 in.	36 in.	
Journals, diameter and length.....	5½ in. by 10 in.	5½ in. by 10 in.	
Water capacity	7,400 gal.	7,400 gal.	
Coal capacity .....	.8 metric tons	.8 metric tons	

* Equivalent heating surface equals total evaporative heating surface plus 1.5 times the superheating surface.

COAL SHORTAGE IN EUROPE

By WALTER S. HIATT*

With the war expected to last until next year the coal shortage in Europe is going to be a distressing subject this winter. It means that the railroads will have a hard time because of the increased cost of coal; it means that many families will have to go without heat; it means that coal may be slightly higher in price in the United States if the American coal merchants are able to deliver all the coal they have contracted to deliver in Europe. If American railroad terminal methods and machinery for handling coal rapidly and in large quantities existed at Italian and French ports, American coal merchants would this year sell upwards of 50,000,000 tons.

Belgium normally produces 20,000,000 tons, more than enough for home consumption, but these mines are not being worked now except in the interest of the Germans. Italy, France and Russia will suffer for want of coal because of the limited home output and lack of the normal amount of importations. Italy produces little coal, Russia barely over 30,000,000 tons and France just over 40,000,000 tons. Of the powers at war England and Germany are the most favored. While the price of coal has already gone up in Germany, its mines are being worked and its production this year will still, despite the number of soldiers taken out of the mines, be adequate for home consumption, though far less than its average production of about 200,000,000 tons. Austria produces almost its normal coal consumption.

The railroads of Germany certainly will not suffer in their war activities from lack of coal, since they consume in normal times but slightly over 11,000,000 tons per year. The increased consumption of coal due to the intricate war movements of trains will not raise this figure to more than 25,000,000. In Russia, however, which because of the blockaded seas has been forced to bring its imports of all kinds of war materials from the Far East on its Siberian railroad, the coal question will further hamper the railroads, which have been working none too smoothly.

The situation in France is typical of many European countries.

* Our Special European Correspondent.

While France has, of course, all the seas open to her, to date she has been unable to import or obtain at reasonable prices the quantity of coal required either for her railroads or for her civil population. As early as last December coal for domestic uses almost doubled in price, going from \$6 to \$11 a ton, and the majority of families went without heat rather than pay the extra price. The railroads were not seriously hampered in this respect because of supplies on hand, and the situation was eased somewhat later in the winter by English imports.

France normally consumes 60,000,000 tons a year, of which amount she herself produces 40,000,000 and the other 20,000,000 she imports either from England or Belgium. But the German invasion cut off the Belgian supply and at the same time cut off the 20,000,000 tons of coal that France normally gets from her northern district on the Belgian frontier.

The French railroads normally consume about 15 per cent, or nearly 9,000,000 tons of the total of 60,000,000 required each year in France. The other 85 per cent is normally distributed as follows: Private use, 20 per cent; industries and manufactures, 28.6 per cent; gas factories, 7.5 per cent; mine industries, 8.9 per cent; metal factories, 17.9 per cent; tug boats, canal barges and ships, 2.2 per cent. This year the railroads will consume about twice the normal quantity because of the necessity of the rapid and quick movements of troops, which require more than the normal number of engines either attached to trains or else always held in readiness for unexpected movements.

In this connection, as a curious fact worthy of note, I counted one day recently in the Paris yards of the Western Railroad no less than 45 locomotives with steam up and merely held in reserve. While a German attack on Paris, or even a general movement to break through the line of trenches 50 miles from Paris, is no longer plausible, the military authorities are today ready for any emergency. For that reason they hold in reserve an army at Paris variously estimated at from 100,000 to 300,000 men, ready either to defend Paris proper or to be launched rapidly out of Paris on a few hours' notice to any part of the trench line that may be overwhelmed.

For the same reason and merely as a precaution the railroad tracks that run out toward Compeigne, Soissons and Reims are either themselves part of a line of reserve trenches or are flanked by a vast network of trenches. In short, the country between Paris and the German line of trenches is protected by some 20 immense lines of reserve trenches spreading out from Paris like a fan and each trench line increasing in length as it is removed from Paris until it may be a hundred miles in length.

Because of the enormity of the importance of railroads in this war, which cannot be overstated, so far as concerns France, a country of short distances, where a false move might wreck her entire plan of campaign, where the loss of a mile or two of territory even, might prove irreparable, it is certain that there will be no coal shortage so far as concerns the railroads. As an arm of the government any available coal will first be placed at their disposition.

The coal question for these various railroad and military uses, as well as for private family consumption, was carefully gone over lately by the Central Committee of the Collieries of France. It pointed out that the miners mobilized in the early part of the war to the number of 4,500 have been returned to the mines and that 3,000 workmen among the refugee Belgians have been employed, and that these workmen, together with others never mobilized, were now working in the mines of central and south France, so that the coal production was now being carried on at the rate of 20,000,000 tons a year, or about half the normal supply, and which supply is directly under the control of the government. The railroad coal, that costs \$3 a ton in the United States, is quoted at \$10 for French coal and \$12 for English coal. It would appear that the first sufferers from the coal shortage will not be the railroads, but the private consumer, who at present is unable to secure deliveries at any price. Despite the high cost of ocean transportation, it is expected that American coal deliveries will ease the situation for all classes of consumers and will tend to keep down prices.

General News Department

United States Consul Silliman, telegraphing from Vera Cruz, September 4, reports the wreck of a railroad train near Mexico City, in which 200 persons were killed.

The Chesapeake & Ohio reports that on its line between Richmond, Va., and Old Point Comfort, 85 miles, more than 300 convictions for trespassing were secured in one month.

The Rock Island Lines have made arrangements with the Railway Educational Bureau, of Omaha, Neb., to extend the privileges of the bureau to Rock Island employees.

The Missouri, Kansas & Texas is reported to have let a contract to Dorset Carter of Oklahoma City for a large part of its coal supply from the southern Oklahoma fields for a term of years.

Trains were run into Galveston, Tex., September 1, the damage to the causeway occasioned by the hurricane of August 16 having by that time been sufficiently repaired to allow the laying of one track.

Sir William MacKenzie, president of the Canadian Northern, announced in Winnipeg last week that that road would be opened for passenger and freight traffic through between the Atlantic and the Pacific in the month of October.

Between Broad street, Philadelphia, and Paoli, 20 miles, the Pennsylvania Railroad is now running a few trains by electric power. The equipment of this section of the road for electric traction has been going on for about two years and the expenditures have amounted to about \$4,000,000. Current is supplied by the Philadelphia Electric Company.

Near Uno, Man., on the morning of September 2, about two o'clock, a trestle bridge of the Grand Trunk Pacific, 1,700 ft. long, and in the middle 85 ft. high, was completely destroyed by a cyclone; and a freight train, coming to the bridge a half hour afterward, was wrecked, resulting in the death of the engineer. A passenger train had passed over the bridge a short time before the storm.

The 57 railroads in Texas which pay taxes under the gross receipts tax law are to receive a refund amounting to \$76,343 out of a special appropriation by the legislature. Some of the larger roads contested the law and had it declared unconstitutional, but many of the smaller roads paid the tax and the state controller refused payment of the refund. The attorney-general of the state has recently rendered an opinion that there is no legal impediment to such payment.

New York Port Improvement Commission

The City of New York, acting through the Board of Estimate and Apportionment, has adopted the proposal made some time ago by the Merchants' Association and endorsed by the Chamber of Commerce to appoint a board of engineers to investigate the freight transportation facilities of the city; and it is announced that the commission consists of John F. Stevens, George F. Swain and William C. Loree. The plan contemplates a study extending over two or three years, at an expense of \$125,000 a year. The estimate includes annual salaries of \$15,000 for each commissioner, \$5,000 each for five assistants; \$2,000 each for five assistants of lower grades, etc. The commission will not organize until the appropriation for its support shall have been approved by the Board of Aldermen. A member of the commission outlines the proposed work as follows:

"We understand that the problem is the study of the terminal facilities of New York City, and the formulation of some plan which will correlate, simplify and facilitate the methods of collection, storage and distribution of freight in New York City. This problem involves the study of the various railroad and steamship terminals, their relation to business centers, the method of carrying freight through the streets, the interchange

of freight between railroad and steamship lines; in general, the entire terminal facilities of the city.

"It is hoped that a feasible plan may be developed by which existing congestion and inconvenience may be removed, cost of handling reduced, and in general the terminal facilities of New York, both as a port and as a manufacturing and consuming center, may be improved and provision made for future growth."

Mr. Stevens is well known as a railroad officer, having been engaged in engineering work in the West from 1874 to 1902, when he became general manager of the Great Northern, with which road he remained, in that and higher offices, until 1905, when he went to the Rock Island. Later he was chief engineer of the Panama Canal, and an officer of the New York, New Haven & Hartford. Dr. Swain is the well-known civil engineer of Boston, consulting engineer of the Massachusetts Railroad Commission since 1887, and member of the Boston Transit Commission for the past 21 years. Mr. Loree was superintendent or general manager in the Baltimore & Ohio System from 1903 to 1914, having before that served 19 years in the engineering department of the Pennsylvania lines west of Pittsburgh. Since January 1, 1914, he has been out of the railroad service.

Newport News Elevator Burned

The grain elevator of the Chesapeake & Ohio at Newport News, Va., was destroyed by fire on the night of September 4, with about 500,000 bushels of grain; estimated loss \$2,000,000. An office building was also destroyed.

New York Railroad Club

At the next regular meeting of the New York Railroad Club, to be held in the Engineering Societies Building, 29 West 39th street, New York, on September 17, a paper will be presented by C. M. Himmelberger, superintendent of the Raritan River Railroad, entitled, "The Freight Terminal."

Traveling Engineers' Association

The twenty-third annual convention of the Traveling Engineers' Association at the Hotel Sherman, Chicago, commenced on Tuesday, September 7, and lasts four days. Abstracts of some of the papers presented and the discussion of them appear elsewhere in this issue. The following is a list of the exhibitors:

American Arch Company, New York.—Represented by Le Grand Parish, W. T. Allison, H. D. Savage, J. P. Neff, A. W. Clokey, G. M. Bean, R. J. Himmelright and J. T. Anthony.
American Locomotive Company, New York.—Photographs. Represented by C. A. Delaney.
American Steel Foundries, Chicago.—Vulcan trucks, Simplex couplers, Economy draft arm, Vulcan brake beams and Simplex truck column. Represented by W. A. Wallace, W. G. Wallace and J. G. Russell.
Ashton Valve Company, Boston, Mass.—Gages, safety valves, whistles and gage-testing devices. Represented by J. W. Motherwell, J. F. Gettrust and H. O. Fettinger.
Barco Brass & Joint Company, Chicago.—Barco engine and tender, flexible connection for air, steam and oil, Barco automatic smoke box blower fitting, Barco flexible joints and Barco gage bracket. Represented by F. N. Bard, C. L. Mellor and L. W. Millar.
Bird-Archer Company, New York.—Boiler compounds. Represented by L. F. Wilson, J. M. Robb and W. S. Reid.
Boss Nut Company, Chicago.—Lock nuts. Represented by J. A. MacLean.
Chambers Valve Company, New York.—Photographs. Represented by F. H. Clark.
Chicago Car Heating Company, Chicago.—Steam hose couplers, pressure-reducing valves, steam traps, stop valves, steam gages and end train pipe valves. Represented by E. A. Schreiber, R. P. Cooley and E. E. Smith.
Chicago Pneumatic Tool Company, Chicago.—Pneumatic tools.
Commercial Acetylene Railway Light & Signal Company, New York.—Headlights. Represented by H. G. Doran.
Crane Company, Chicago.—Valves. Represented by F. D. Fenn and F. W. Venton.
Dearborn Chemical Company, Chicago.—Represented by J. D. Purcell, G. R. Carr and J. H. Cooper.
Delaware Railway Specialty Company, Wilmington, Del.—Automatic drifting device for superheater locomotives. Represented by W. H. Savery.
Detroit Lubricator Company, Detroit, Mich.—Detroit automatic flange lubricator. Represented by A. D. Homard.
Economy Devices Corporation, New York.—Rushton screw reverse gear, Casey-Cavin reverse gear, Ragonnet reverse gear, Universal valve chest and radial buffer and engine truck. Represented by H. F. Ball and J. L. Randolph.

Edna Brass Company, Cincinnati, Ohio.—Injectors, valves and fittings. Represented by E. O. Corey and H. A. Glenn.

Equipment Improvement Company, New York.—Markel locomotive devices, Wine side bearings and Trojan packing. Represented by E. E. Sawyer and C. W. Cross.

Franklin Railway Supply Company, New York.—Franklin fire-door. Represented by C. W. F. Coffin, W. H. Coyle, R. Coburn, J. Sinkler and S. Rosenfelt.

Galena Signal Oil Company, Franklin, Pa.—Represented by J. E. Linahan, W. J. Walsh, W. Holmes, J. A. Roosevelt, G. E. McVicar, W. O. Taylor, D. L. Eubank, C. B. Royal, W. E. Brumble, M. M. Meehan, J. S. Brown, J. P. Ferguson, F. B. Smith, J. A. Graham and J. G. Arn.

Garlock Packing Company, Palmyra, N. Y.—Garlock packing. Represented by J. P. Landreth, G. H. Green and M. E. Hamilton.

Greene, Tweed & Co., New York.—Packings. Represented by N. B. Nickerson.

Henry Manufacturing & Grease Cup Company, Terre Haute, Ind.—Grease cups. Represented by M. Henry.

Hunt-Spiller Manufacturing Corporation, Boston, Mass.—Hunt-Spiller gun iron and Hunt-Spiller cylinder and valve packing. Represented by J. G. Platt, V. W. Ellet, J. M. Monroe and H. B. Parker.

Jerome-Edwards Metallic Packing Company, Chicago.—Metallic packing. Represented by G. C. Jerome and R. L. McIntosh.

Kelley-Wood Safety Locomotive Side Curtain Company, Chicago.—Locomotive side curtain. Represented by W. F. Kelley.

Leslie Company, The, Lyndhurst, N. J.—Presto coupling nuts and regulators. Represented by S. I. Leslie and J. Cizek.

Liberty Manufacturing Company, Pittsburgh, Pa.—Locomotive tube cleaners. Represented by C. L. Brown and C. T. Davis.

Locomotive Pulverized Fuel Company, New York.—Represented by J. E. Muhlfeld.

Locomotive Superheater Company, New York.—Model of welded superheater unit, pyrometer, and grinding tools. Represented by John Bell, W. Boughton, W. A. Buckbee, G. Fogg, C. D. Hilferty, B. G. Lynch, S. MacDonald, A. C. McLachlan, J. E. Morn, R. M. Ostermann, R. R. Porterfield, G. E. Ryder, G. E. Spangler, W. G. Tawse and C. N. Wickerham.

Long, Jr., & Co., Charles R., Louisville, Ky.

Manning, Maxwell & Moore, Inc., New York.—Inspirators, valves and gages. Represented by C. L. Brown and F. J. Wilson.

McCord & Co., Chicago.—Journal boxes and lubricators. Represented by O. H. Neal.

Mudge & Co., Chicago.—Mudge-Slater front end. Represented by G. W. Bender and B. W. Mudge.

Nathan Manufacturing Company, New York.—Injectors, lubricators, boiler checks and boiler supplies. Represented by A. S. Work, J. S. Seeley, W. R. Walsh and G. Royal.

National Boiler Washing Company, Chicago.—Safety-first fire door. Represented by H. A. Varney.

National Graphite Lubricator Company, Scranton, Pa.—Represented by L. S. Watres.

National Railway Devices Company, Chicago.—Shoemaker fire door. Represented by J. G. Robinson.

Okadee Company, Chicago.—Blow-off cocks, tank hose and strainer drain valve. Represented by A. G. Hollingshead.

Ohio Injector Company, Chicago.—Ohio injector, Chicago injector and Chicago flange lubricator. Represented by W. S. Furry, F. W. Edwards, F. B. Wiperman and A. C. Beckwith.

O'Malley-Beare Valve Company, Chicago.—Multi-plate valves. Represented by E. O'Malley and T. O'Malley.

Paxton-Mitchell Company, Omaha, Neb.—Metallic packing. Represented by C. A. Coons.

Pilliod Company, The, New York.—Baker valve gear. Represented by R. H. Weatherly.

Pocket List of Railroad Officials, New York.—Represented by C. L. Dinsmore.

Pyle-National Electric Headlight Company, Chicago.—Young locomotive valve gear and Pyle-National electric headlight. Represented by R. C. Vilas, W. Miller, J. E. Kilker, C. W. Young, W. T. Bretherton, L. H. Steger, F. Kersten and C. E. Miller.

Robinson Company, Boston, Mass.—Exhaust nozzle. Represented by H. M. Parker.

Sellers & Co., Inc., William, Philadelphia, Pa.—Injectors and boiler fittings. Represented by S. L. Kneass, G. W. Wilson and L. H. Burns.

Simmons-Boardman Publishing Company, New York.—*Railway Age Gazette* and *Railway Age Gazette, Mechanical Edition*. Represented by R. E. Thayer, L. B. Sherman and F. H. Thompson.

Southern Locomotive Valve Gear Company, Knoxville, Tenn.—Southern valve gear. Represented by E. L. Chollman and J. A. Murrain.

Standard Heat & Ventilation Company, New York.—Represented by C. H. McCormick.

Storrs Mica Company, Owego, N. Y.—Represented by C. P. Storrs.

United States Graphite Company, Saginaw, Mich.—Graphite and graphite paint. Represented by J. W. Ediston and J. G. Drough.

United States Metallic Packing Company, Philadelphia, Pa.—Metallic packing. Represented by M. Brewster, H. M. Wey and J. C. Mace.

Vissering & Co., Harry, Chicago.—Metallic packing and bell ringer. Represented by Harry Vissering, G. S. Turner and W. H. Heckman.

Western Railway Equipment Company, St. Louis, Mo.—Locomotive devices. Represented by Louis Hoerr.

Westinghouse Air Brake Company, Pittsburgh, Pa.—Represented by L. M. Carlton, W. M. Sleet, A. K. Homeyer, J. A. O'Malley, W. V. Turner and S. J. Kidder.

White American Locomotive Sander Company, Roanoke, Va.—Represented by W. H. White.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, date of next or regular meetings, and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the *Railway Age Gazette* for each month.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next meeting, October 21-23, 1915, Boston, Mass.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St. New York. Annual convention, October 4-8, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. G. McConaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next meeting, November 17, 1915, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 19-21, 1915, Detroit, Mich.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, 2d Tuesday in October, 1915, New York.

ASSOCIATION OF RAILWAY ELECTRIC ENGINEERS.—Jos. A. Andreuccetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual meeting, October, 1915.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next meeting, October 19-21, 1915, St. Louis, Mo.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 14-16, 1915, Detroit, Mich.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

RAILROAD MEN'S IMPROVEMENT SOCIETY.—J. B. Curran, Erie R. R., 50 Church St., New York. Meetings, alternate Thursdays, October to May. Assembly Rooms of Trunk Line Association, 143 Liberty St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1063 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Next meeting, October 5-7, 1915, Chicago.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Annual meeting, September 14-17, 1915, Salt Lake City, Utah.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., 1134 La Salle St. Sta., Chicago. Annual meeting, October 19-21, Colorado Springs, Colo.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Piedmont Hotel, Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Booddy House, Toledo.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEWARK.—John J. Kautzmann, P. O. Box 238, Newark, N. J. Regular meetings, 1st Monday in month, except July and August, The Washington, 559 Broad St., Newark.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Hotel Astor, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Gen'l Agt., Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings bi-monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, N. Y. C. R. R., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., East Buffalo, N. Y. Annual meeting, September 7-19, 1915, Chicago.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Building, Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings. Annual meeting, 1st Wednesday after 1st Thursday in January, Chicago.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JULY, 1915

Name of road.	Average mileage operated during period.	Operating revenues				Operating expenses				Net From Railway	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger (inc. misc.)	Total.	Way and structures of equipment	Traffic.	Trans- portation.	Miscel- laneous.	General.				
Alabama & Vicksburg	143	\$75,999	\$34,760	\$110,759	\$17,358	\$3,685	\$43,539	\$2,067	\$5,417	\$102,882	\$7,750	\$11,021	\$3,032
Atchafalaya, Topeka & Santa Fe	8,620	5,057,387	2,959,805	8,017,192	1,250,392	1,386,338	199,699	2,394,095	165,688	5,384,164	411,645	2,997,119	599,253
Atlanta & West Point	93	44,476	39,012	83,488	13,803	22,701	30,331	2,550	4,445	79,559	5,525	11,654	627
Atlanta, Birmingham & Atlantic	638	166,624	45,017	211,641	35,674	40,000	95,842	24	13,124	36,729	13,100	194,125	13,003
Atlantic & St. Lawrence	167	68,151	29,180	97,331	108,259	15,937	52,270	.....	3,651	97,409	11,505	—655	—908
Atlantic Coast Line	4,698	1,441,687	562,156	2,003,843	380,434	442,021	51,746	846,953	73,010	1,799,834	140,000	234,518	—79,332
Baltimore, Chesapeake & Atlantic	88	90,015	37,904	127,919	28,830	2,203	72,498	.....	2,916	117,718	2,249	36,794	—7,531
Bangor & Aroostook	632	155,517	52,399	207,916	48,158	48,577	72,364	.....	10,774	185,904	12,675	27,716	—12,608
Belt Ry. Co. of Chicago	24	.....	239,227	239,227	16,681	25,669	96,561	.....	5,920	145,501	10,759	82,968	—37,851
Buffalo & Susquehanna Railway	91	16,934	6,740	23,674	3,892	5,005	11,273	.....	2,384	23,055	1,600	1,644	8,510
Canadian Pacific Lines in Maine	233	39,402	16,425	55,827	18,409	13,792	27,291	.....	3,224	68,303	14,250	—18,037	10,535
Carolina, Clinchfield & Ohio	283	166,481	20,723	187,204	19,249	24,630	32,387	.....	8,354	92,226	12,000	84,878	—472
Carolina, Clinchfield & Ohio of S. C.	18	7,496	1,137	8,633	1,615	89	2,126	.....	410	5,872	750	2,312	—2,752
Central of Georgia	1,924	626,848	276,559	903,407	145,596	168,549	347,429	.....	39,823	737,882	249,945	198,247	—59,679
Central of New Jersey	681	1,758,576	697,357	2,455,933	245,302	514,219	879,970	16,899	67,449	1,761,685	117,151	720,714	—79,146
Central New England	304	306,103	43,430	349,533	52,681	27,797	97,827	.....	4,234	183,544	12,800	167,797	120,422
Charleston & Western Carolina	341	82,719	27,416	110,135	27,697	21,713	44,524	.....	4,881	102,569	5,000	9,022	—2,586
Chesapeake & Ohio Lines	2,374	2,868,953	546,181	3,415,134	415,858	770,271	52,044	1,054,904	74,420	2,384,974	115,120	1,142,104	317,007
Chicago & Alton	1,052	730,725	337,801	1,068,526	165,684	285,403	405,285	9,298	30,184	938,873	43,126	206,065	—88,654
Chicago & Erie	270	435,054	55,874	490,928	81,074	48,182	16,237	213,931	14,649	375,195	20,500	142,963	199,940
Chicago, Burlington & Quincy	9,366	4,557,034	2,045,636	6,602,670	1,027,346	1,361,506	2,283,596	76,480	169,150	5,060,437	353,416	1,960,271	—458,919
Chicago, Great Western	1,427	726,494	296,070	1,022,564	191,966	174,354	391,286	8,452	34,922	887,051	47,150	194,113	29,837
Chicago, Milwaukee & St. Paul	10,076	5,330,892	1,804,529	7,135,421	962,626	1,174,833	2,730,886	68,895	165,815	4,900,321	447,232	2,810,539	428,688
Chicago, Rock Island & Gulf	477	154,092	55,456	209,548	42,660	34,679	97,274	2,149	7,672	193,803	10,592	24,146	—15,842
Chicago, Rock Island & Pacific	7,657	3,298,355	1,729,508	5,027,863	987,625	1,105,730	2,136,801	59,701	143,721	4,534,870	268,278	634,168	—336,217
Chicago, Terre Haute & Southeastern	374	143,626	15,185	158,811	33,400	33,103	48,517	733	8,344	127,565	10,417	25,289	—21,573
Cincinnati, Hamilton & Dayton	1,003	678,006	146,801	824,807	135,150	139,650	350,922	3,052	19,734	667,440	33,170	219,596	31,368
Cincinnati Northern	246	111,143	21,777	132,920	30,951	23,791	43,203	.....	3,926	104,398	5,300	29,093	—19,772
Cleveland, Cincinnati, Chicago & St. L.	2,381	2,078,846	801,518	2,880,364	421,786	613,075	1,087,816	24,994	70,328	2,855,075	128,000	750,026	50,026
Colorado & Southern	1,089	423,632	149,598	573,230	98,374	150,757	181,284	5,088	24,302	471,158	35,000	111,961	55,942
Detroit & Toledo Shore Line	79	105,529	.....	105,529	14,254	7,477	30,678	.....	2,574	56,530	5,575	43,792	13,041
Detroit, Grand Haven & Milwaukee	191	164,000	55,000	219,000	24,924	6,080	105,120	.....	4,725	159,841	3,770	85,501	64,838
Detroit, Toledo & Ironton	441	190,163	14,175	204,338	16,197	21,218	60,509	.....	5,891	107,615	82,250	19,988	3,384
Duluth, Missabe & Northern	370	1,398,480	26,757	1,425,237	101,411	114,513	179,980	4,137	18,793	492,958	35,075	334,434	79,741
Elgin, Joliet & Eastern	777	826,556	15	826,571	89,623	144,488	233,868	.....	18,793	492,958	35,075	334,434	79,741
Erie	1,988	3,742,838	924,202	4,667,040	471,368	817,366	1,649,477	33,630	103,768	3,149,757	168,654	1,815,778	500,869
Florida East Coast	745	207,574	96,875	304,449	65,488	53,772	147,372	2,577	19,788	292,529	18,514	51,704	45,609
Fort Worth & Denver City	454	246,735	128,483	375,218	67,548	82,038	130,642	3,041	15,253	306,151	12,653	86,815	18,942
Galveston Wharf	13	.....	.....	.....	5,086	3,338	32,339	28,205	410	69,959	9,218	33,557	6,832
Grand Rapids & Indiana	575	239,894	174,568	414,462	54,376	59,689	182,527	3,879	14,327	327,166	37,400	105,959	—12,551
Grand Trunk Western	347	452,000	144,000	596,000	64,820	110,794	221,523	6,027	13,596	435,312	32,970	167,666	114,172
Great Northern	8,102	3,868,317	1,327,896	5,196,213	761,509	522,437	1,509,211	84,663	103,292	3,122,769	368,760	2,366,113	—529,915
Gulf & Ship Island	308	98,978	31,374	130,352	15,773	26,436	37,800	277	6,464	89,380	7,596	42,997	665
Gulf, Colorado & Santa Fe	1,937	884,009	295,331	1,179,340	228,894	196,382	437,850	.....	32,322	920,987	58,203	271,676	—130,805
Hocking Valley	351	42,199	74,575	116,774	50,045	82,835	160,078	.....	16,809	318,071	225,065	187,665	117,979
Lake Erie & Western	900	393,132	69,801	462,933	68,817	110,807	170,518	.....	12,967	375,399	24,000	89,653	—37,198
Lehigh Valley	1,442	3,043,820	442,387	3,486,207	411,661	786,652	1,197,862	12,292	74,200	2,566,419	138,000	1,028,544	110,447
Long Island	398	300,144	1,064,109	1,364,253	135,256	132,879	479,458	6,514	34,936	807,668	77,645	667,415	7,777
Louisiana Ry. & Navigation Co.	351	131,066	29,192	160,258	30,617	25,484	57,375	.....	4,936	124,039	45,200	35,698	—1,206
Louisiana Western	208	104,773	53,871	158,644	21,170	33,252	47,696	2,100	6,286	117,538	10,025	43,934	378
Louisville & Nashville	5,037	3,202,853	964,513	4,167,366	704,835	822,476	1,342,490	29,950	108,088	3,116,579	189,354	1,179,562	103,709
Louisville, Henderson & St. Louis	200	71,727	32,618	104,345	39,239	51,176	37,109	.....	2,839	100,404	10,979	7,165	—21,476
Moquiss, La. & Texas R. R. & S. S. Co.	405	195,198	80,177	275,375	53,252	51,529	123,951	2,593	11,928	254,444	20,881	30,926	—16,617
Maine Central	1,220	550,039	367,424	917,463	155,624	127,815	358,154	10,035	56,414	298,904	53,098	245,806	2,352
Michigan Central	1,785	1,705,319	990,561	2,695,880	382,832	464,069	1,035,865	44,563	56,414	2,042,512	121,000	885,903	214,448
Minneapolis & St. Louis	1,646	563,154	175,631	738,785	101,407	114,982	279,963	90	20,530	535,547	31,190	225,938	25,402
Minn., St. Paul & Sault Ste. Marie	4,190	1,548,533	614,204	2,162,737	317,847	308,797	713,691	22,132	65,198	1,477,040	105,996	1,477,040	805,154
Missouri, Kansas & Texas System	3,865	1,647,853	692,862	2,340,715	429,908	402,213	931,010	16,388	80,990	1,912,586	132,451	471,483	—158,165

Traffic News

Western Railroads to Ask Rehearing of Rate Case

C. C. Wright, general solicitor of the Chicago & North Western and chairman of the committee of railroad lawyers that had charge of the western freight rate advance case for the railways, announced, after a meeting on September 3, that the roads had decided to petition the Interstate Commerce Commission for a rehearing of the case. The petition is to be filed with the commission this week.

Low Freight Rates Between New York and California

At hearings held in New York City, September 1, 2 and 3, by Examiner Thurtell, of the Interstate Commerce Commission, L. J. Spence, director of traffic, and other officers of the Southern Pacific, presenting their request for the approval of reductions in the freight rates on 20 or more commodities from New York to Pacific coast seaports; gave testimony concerning what they had heard relative to rates at which freight is carried by water all the way from New York to Los Angeles and San Francisco through the Panama canal. The principal items in this statement are shown below:

COMPARISON OF RATES SOUGHT TO BE ESTABLISHED BY SUNSET GULF ROUTE, WITH LOWEST KNOWN WATER RATES SINCE THE OPENING OF THE PANAMA CANAL.

Commodity	Proposed Rate via Sunset- Gulf Route		Lowest Known Rates Via Panama Canal
	Min. Weight	Rate	
Calcium, Chloride of.....	80,000	45	30
Canned Corn.....	70,000	50	40
Canned goods, other.....	70,000	50	50
Coffee, Green.....	70,000	50	45
IRON AND STEEL—Various articles.....	80,000	45	25
Chain.....	80,000	45	30
Nails and Spikes.....	90,000	40	25
Oil Cloth and Linoleum, etc.....	60,000	60	50
Paint, in Oil.....	50,000	60	50
Paint, Dry.....	60,000	50	40
PAPER, Boxes, k. d., etc.....	60,000	60	40
Book, (Surface-Coated), etc.....	50,000	60	50
News, and Book, n. o. s.....	60,000	50	45
Building, etc.....	60,000	50	45
Soap.....	90,000	40	35
Soda, Bi-Carbonate.....	80,000	45	40
Twine and Cordage, Rope, etc.....	50,000	55	50
Wire Rope and Cable.....	60,000	55	50
Wire, Telephone, etc.....	60,000	50	50

* Contract rate.

Counsel for all-water freight lines running through the canal, objecting to a reduction of rates by the Southern Pacific, questioned the figures of all-water rates given by the Southern Pacific, claiming that in some cases they were too low.

The Southern Pacific laid before the commission data showing that with the present facilities of its water line from New York to Galveston and the rail line from Galveston to the Pacific coast the rates proposed, with goods moving in full carloads, would produce revenue in excess of the out-of-pocket cost of handling the goods.

The rates proposed apply to westbound shipments. Similar reductions have already been made on important commodities eastbound.

Of the commodities named in the foregoing list, it was said that the total volume in the last fiscal year was 296,000 tons, of which the Southern Pacific estimated that its water and rail line secured about one-fourth.

Testimony was introduced tending to show that some of the steamship lines operating through the Panama canal are making good profit, and that they have taken large quantities of numerous classes of goods, which before the opening of the canal went by more northern routes; and they expect to take still more.

As to the application of the long-and-short-haul clause of the Interstate Commerce law, Mr. Spence said that none of the commodities named in his application is produced at any point on the Southern Pacific's Sunset-Gulf Line.

The westbound freight traffic of the Sunset-Gulf Line has fallen off greatly since 1907, and it appears that some of the loss occurred before the opening of the Panama canal, being due to the inroads of the Tehuantepec route.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission has postponed from October 1 to December 1 the date on which the reductions will go into effect in the rates on anthracite coal from the mines in eastern Pennsylvania to tidewater and other Eastern points. The commission's decision ordering these reductions was abstracted in the *Railway Age Gazette* of August 20, page 313.

Midcontinent Oil Rates

Milliken Refining Company v. Missouri, Kansas & Texas et al. Opinion by Commissioner Harlan:

This proceeding, which is numbered 6129, also embraces a large number of other complaints, and in connection with it the commission reopened ten other cases that were decided sometime ago. The midcontinent field includes the oil territory of Kansas and Oklahoma, though in Kansas the wells no longer flow and the business there is made up of the shipments from refineries which receive crude oil largely through pipe lines from Oklahoma wells. Railroad rates from this field have been a source of complaint for many years. The report in this case fills 20 pages, separate chapters being devoted to the tariffs to different cities, St. Louis, Chicago, Milwaukee, St. Paul, Winnipeg, Des Moines, Omaha, Sioux City, Salt Lake City, Denver, Kansas City, Joliet, New Orleans, Hannibal, and a number of other places. The situation is so complicated that the demand for reparation is denied; and, indeed, all of the formal complaints are dismissed, but without prejudice; and the carriers are simply directed in a general way to carry out the ideas of the commission, as set forth in detail. These require many increases as well as reductions. The decision is summarized in the headnotes as follows:

1. Reasonable rates are fixed on petroleum oil and its products from the midcontinent oil field, in Kansas and Oklahoma, to Kansas City, St. Louis, Chicago, and various other points.
2. All points in the midcontinent field are grouped with respect to rates to the Mississippi River and points beyond, including St. Paul territory, Winnipeg, Salt Lake City and Denver.
3. Reasonable maximum rates prescribed on low-grade products from midcontinent points to St. Louis and Chicago.

Hoboken Demurrage Charges Reasonable

Plymouth Coal Company v. Delaware, Lackawanna & Western Railroad. Opinion by Commissioner Hall:

Defendant's demurrage regulations governing anthracite coal awaiting transshipment at or near tidewater at Hoboken, N. J., are found reasonable. For many years prior to 1904 the defendant maintained at Hoboken a large number of bins and piers set apart for the storage of anthracite coal. These facilities were open to all shippers without other charge than the regular rates for the transportation of the coal from mine to tidewater. They were destroyed by fire on May 29, 1904, and were not rebuilt. Thereafter shippers obtained the substantial equivalent of this service by what was known as the "borrow and loan account." Under this arrangement shippers would "loan" to defendant the excess stock of any size of anthracite coal which they might have at tidewater. When stock conditions were reversed, the shippers would "borrow" coal from defendant. This system was in vogue until, in 1909, the Delaware, Lackawanna & Western Coal Company was organized by defendant as a result of legislation and litigation in respect of the commodities clause, and took over the coal sales business theretofore conducted by defendant.

From this time until the establishment of the demurrage regulations now in question, shippers were given free storage of coal in cars at the transshipment point for indefinite periods, subject to occasional endeavors by defendant in times of congestion to effect the release of cars by embargo of further shipments to designated consignees until the congestion was relieved. In its brief defendant admits that "prior to the effective date of the

tariff attacked in this proceeding, no demurrage was ever charged on tidewater coal held for transshipment at Secaucus or Hoboken."

Complainant asserts that the present situation is exceptional in that the business of complainant and other shippers has been built upon a system which permitted free storage of coal at Hoboken for an indefinite period; that any system of demurrage regulations inevitably operates for the benefit of the largest shipper because it can more readily meet the varying demands for the eight sizes of anthracite coal and is thus able promptly to dispose of its coal; and that the interest of the consuming public requires the continued maintenance of free storage at or near tidewater at Hoboken in order to prevent coal shortages in the New York market. If the present regulations are found to be just and reasonable, the commission is asked to reduce the rates for the transportation of anthracite coal to tidewater. It is undoubtedly the right of defendant to establish and maintain demurrage regulations under which a reasonable charge will accrue for detention of cars beyond a reasonable period. Defendant's facilities for transferring coal to vessels at tidewater are modern and are more than adequate to meet any demands thus far made upon them. The free storage is purely a commercial convenience and not a transportation necessity. Upon this record, and in accordance with the cases cited, we conclude that the demurrage regulations in issue are reasonable. The complaint will be dismissed. (36 I. C. C., 76.)

STATE COMMISSIONS

The hearing before the Texas Railroad Commission on the application of the Texas railroads for authority to increase freight rates 15 per cent throughout the state was resumed on September 1 at Austin. Testimony prepared for the commission was introduced in rebuttal to the testimony given by the carriers at the previous hearing, which was held at Dallas. Attorneys for the railroad commission issued a statement contending that the railways are not entitled to any general increase because they are already earning a sufficient revenue on state business and upon the value of their property as apportioned to use in state traffic.

The New York state public service commission, second district, announces that, at a conference held in Albany on Wednesday of this week, it induced the railroads to modify their requirement as to certificates of value of baggage. Hereafter the passenger need not declare a specific value unless it is high enough to incur the extra charge; that is, unless it is over \$100 in interstate travel and over \$150 for a journey within the state of New York. Passengers will still be required to sign a slip declaring that it is below these limits, or, if above them, to specify the value and pay the extra charge. The commission, according to its announcement, is determined to do justice both to actresses who travel with wardrobes worth \$30,000 and to gentlemen hurriedly departing with a toothbrush and another rubber collar. "No man can, and no woman wants to tell what the things in his or her trunk are worth," says Chairman Van Santvoord; and he is determined that the up-state citizens, whose consciences are declared to be exceedingly sensitive, will not be required to subscribe to any falsehood, even a potential one.

PERSONNEL OF COMMISSIONS

C. P. Howard has been appointed field engineer of the valuation department of the Interstate Commerce Commission for the Central district, with headquarters at Chicago.

COURT NEWS

Interstate Shipments—Presentation of Claims—Waiver

An interstate shipper, required by a contract of shipment to give notice of any claim for loss within a specified time, gave notice of claim after the expiration of the time. The railroad's auditor asked for particulars and stated that the records showed a delivery of the freight with billing instructions. The shipper did not comply with the request for particulars and did not reply to the auditor. In an action or damages for injury by weather in transit the Texas Court of Appeals held that the act of the auditor did not constitute a waiver by the railroad of the shipper's failure to present notice of claim within the time stipulated. A

stipulation or written notice of claims for loss, damage or delay within four months after delivery, was held valid notwithstanding the provision of the Carmack amendment, making the initial carrier liable for any loss caused by it, or any connecting carrier, and providing that no contract shall exempt the initial carrier from the liability imposed.—*Stevens & Russell v. St. Louis S. W. (Tex.)*, 178 S. W. 810.

Power of State Commission to Change Passenger Rates

The Supreme Court of Nebraska holds, by a divided court, that the power conferred in general terms on the state railway commission does not authorize the commission to increase the maximum passenger rate of two cents a mile as fixed by the legislature in 1907. The rule is that a particular intention expressed in a legislative act, if in conflict with a general intention expressed in a later enactment, should be given effect, leaving the later act to operate only outside of the scope of the former.—*State ex rel. Mo. Pac. v. Clark (Neb.)*, 153 N. W. 623.

Crossing Accident—Physical Facts

In an action for injuries to an automobile in a crossing collision the driver of the automobile admitted that though he had a clear view he did not stop, look, or listen, and did not look at the tracks until within 25 feet of them. It appeared that he was struck by cars which were kicked from some distance down the track. It was held by the Texas Court of Appeals that he was, as a matter of law, guilty of contributory negligence, though he testified to seeing the engine standing quiet on the tracks before he attempted to cross (*Ft. Worth & D. C., Tex.*, 178 S. W., 795).

Validity of Contracts with Labor Union

Suit for injunction was brought by switchmen against the Texas & P. and other railroads to prevent their carrying out contracts which, it was alleged, substantially provided that no switchmen should be employed who were not members of the Brotherhood or Railway Trainmen. The Texas Court of Civil Appeals holds that the fact that a contract between a railroad and a labor union providing for the employment of a specific percentage of employees from members of such union, and preference of such members in employment, was one-sided, wanting in mutuality and unenforceable at law, could not be complained of by strangers to the contract not in privity with the parties thereto. Such a contract was not void as against public policy. The railroads by entering into the contracts did not unlawfully create a monopoly which interfered with or prevented others from exercising the freedom of contract in relation to the sale of labor. There was reason in contracting with the Brotherhood, for its membership greatly exceeded the membership of any other particular union, which was a guaranty of keeping a full working force. But the contract was not exclusive; it provided for only a certain per cent of Brotherhood men, and the evidence showed that the railroads have a larger percentage of other classes employed than of the Brotherhood, in proportion to membership. The injunction was denied (*Underwood v. Texas & P., Tex.*, 178 S. W., 38).

Gross Earnings Tax—Double Taxation—One Company Agent of Another

Where one carrier enters into arrangements with other carriers by which the first becomes practically the hiring and disbursing agent of the others in the performance of duties partly owing by both principals and agents, paying out for and receiving from the others only the actual cost of the service, with no intention of making a profit out of the transaction, the Minnesota Supreme Court holds that, if such arrangements are made in good faith and not in fraud, subterfuge or evasion of the obligations of either party to the state or to the public, such moneys are not subject to the gross earnings tax. Where such services are included in the freight charges of the other railroad companies, which pay a gross earnings tax thereon, to compel the agent company to pay a tax on these same receipts would be in the nature of double taxation, exacting the commutation taxes on the same property twice, which cannot lawfully be done.

The defendant and certain navigation companies agreed that the defendant should employ stevedores to perform certain work,

part of which it was defendant's duty to perform; the navigation companies paying to the defendant the actual cost of the labor. The defendant, in hiring the men to do the work, really acted for the boat companies as hiring and disbursing agent, paying for the actual cost of the work and receiving back from the boat companies what is expended. Under the rule above stated the moneys so received back were held not subject to the gross earnings tax.—*State v. Northern Pacific (Minn.)*, 153 N. W. 850.

Free Pass—Assumption of Risk

A contract with an express company provided that messengers should render service to the railroad and in consideration thereof receive a sum of money and also two passes a month for the use of his family. In an action for injuries to the wife of a messenger while traveling on a pass, the New Jersey Court of Errors and Appeals holds that such a pass is a "free pass," in the sense intended by the interstate commerce law, and a clause printed on the pass, whereby the passenger undertakes to assume all risks, is binding on the party using it (*Morris v. West Jersey & S., N. J.*, 94 Atl., 593).

Guarding Low Bridges to Protect Brakemen

A railroad maintained standard "telltales" at a proper distance on each side of a low bridge. The bridge gave about three feet headway above the cars. A brakeman was killed by striking his head against the bridge. In an action for his death the New Jersey Court of Errors and Appeals holds that a railroad is not chargeable with negligence as regards brakemen on its freight trains, in failing to illuminate at night a low bridge over its tracks, in the absence of proof that such a provision was customary in railroad practice (*Raub v. Lehigh Valley, N. J.*, 94 Atl., 567).

Crossing Accident

Employees, seeing a person standing to one side of the track at a crossing, in a place of safety, are not negligent, the Oklahoma Supreme Court holds, in assuming that he will remain in that place of safety, and not heedlessly run upon the track in front of moving cars. If he does so, and it is impossible to stop the train in time to avoid killing him, the company cannot be held liable for his death. In such circumstances failure to ring the bell and sound the whistle on approaching the crossing would not make the company liable, for such failure would not be in any manner responsible for the deceased's going on the track (*St. Louis, I. M. & S. v. Gibson, Okla.*, 150 Pac., 465).

Crossing Accident—Testimony Contrary to Physical Facts

In an action for personal injuries it appeared that plaintiff crossed a railroad of seven tracks in a rubber-tired open buggy at 8:45 on an ordinary July evening. There were no obstructions, the tracks were straight, and he was familiar with the locality. He testified that he looked and listened all the time while crossing, without seeing or hearing the locomotive, bearing a red light, which struck his buggy on the last track. The St. Louis Court of Appeals held that his evidence would be treated as of no effect, as being contrary to the established physical fact that by looking and listening, an object of the size and attributes of a moving locomotive may be detected before collision. Judgment for the plaintiff was reversed (*Landrum v. St. Louis, I. M. & S., Mo.*, 178 S. W., 273).

Taxation of Railroad Property

A railroad was forced to construct a subway to carry a street under its roadbed and overhead bridges to carry streets over it. In its application to be relieved from items of an assessment, the New York Court of Appeals holds that its share of the cost of the work was improperly included in the assessment of its special franchise on the theory that the subway and bridges were tangible property of the road "situated in, upon, under or above any street, highway, public place or public waters" in connection with the special franchise made assessable by the New York tax law. In such a case the structure, the cost of which was attempted to be assessed, was part of a public street and belonged to the municipality, though there was physical connection between the struc-

ture and the road's right of way.—*People ex rel. New York, O. & W. v. State Board of Tax Comrs. (N. Y.)*, 109 N. E. 547.

Sufficiency for Claim of Damage

A bill of lading provided that claims for loss must be made in writing within four months after delivery. On the arrival of the freight at its destination the consignee notified the consignor by telegram that it had arrived in bad order. The consignor immediately went to the place of delivery and notified the claim agent of the terminal carrier that he would file a claim, but no claim was filed. The yard agent was also notified by an employee of the consignee that a claim for damages would be filed. A notation made on the expense bill by the agent of the terminal carrier at the point of destination recited that the freight was more or less damaged. It was held by the Texas Court of Appeals that there was a failure to give notice of a claim for damages and there could be no recovery of damages.—*St. Louis S. W. v. Overton (Tex.)*, 178 S. W. 814.

Evidence as to Reasonable Time for Run

In an action for damages to live stock by delay in transit the Texas Court of Civil Appeals holds that the admission of testimony of the plaintiff as to what, in his opinion, was a reasonable time for the run of the train, was erroneous, since what is a reasonable time to make a given trip is a mixed question of law and fact for the jury, under proper instructions. A duly qualified witness might give evidence as to what was the usual or customary time required to make the run, such testimony not being matter of opinion infringing the province of the jury, "usual time" being a matter of fact. "Reasonable time," on the other hand, is the time necessary under the circumstances to do conveniently what the contract or duty requires should be done in a particular case, a question of law depending on the subject-matter and situation of the parties (*Gulf C. & S. F. v. Bogy, Tex.*, 178 S. W., 577).

Manager's Right to Salary While on Leave of Absence

A general manager appointed an assistant general manager to hold the position at his discretion at a fixed salary per month. On the ground of ill health from application to his duties, the assistant was granted a leave of absence from October 13, 1911, to January 8, 1912, on salary and subject to orders and directions. The railroad's by-laws then contained no provisions as to leave of absence or deduction of salary. The assistant general manager during his absence had written daily letters relative to the business of his office. On his return on January 8, and on his request, he was relieved of his position and appointed to another. In an action for the balance of his salary the Texas Court of Civil Appeals held that the relation of employer and employee continued, and that the assistant general manager could recover his fixed salary for the period of his absence. Payment thereof was not prohibited by the Texas statute of 1911, providing that no corporation shall employ or use its means except in the legitimate objects of its creation (*Missouri, K. & T. v. Bryant, Tex.*, 178 S. W., 685).

Termination of Relation of Passenger

In an action for personal injuries it appeared that the plaintiff, traveling on a ticket which entitled him to ride from New York to South Orange, stayed in the train after it left that station stop, without the payment of extra fare, for the purpose of alighting at a place in the company's yard about three-quarters of a mile beyond. This place was nearer to his residence than the station. He was thrown off when about to alight by a lurch of the train going through a switch. He and others frequently got off at the place in question, which was covered with cinders between the tracks, though there was no station or platform there. The New Jersey Court of Errors and Appeals held that, after leaving the South Orange station, the man ceased to be a passenger and became only a licensee on the train. The company no longer owed him the high degree of care due to a passenger, but only the exercise of ordinary care against inflicting injury upon him. It was held, further, that the trial judge was right in granting a nonsuit, because the question at issue arose upon uncontroverted proofs, and was therefore one for the court and not for the jury.—*Keeney v. D., L. & W. (N. J.)*, 604.

Railway Officers

Executive, Financial, Legal and Accounting

A. A. Holmes, assistant to president and purchasing agent of the Atlanta & St. Andrews Bay, has been appointed auditor, with headquarters at Panama City, Fla.

H. A. McLaurin has been appointed auditor and car accountant of the Gainesville & Northwestern, with headquarters at Gainesville, Ga., succeeding Robert E. Farmer, who has resigned to go to another company.

William G. Wheeler, who was appointed general solicitor of the Chicago & North Western on September 1, was born



W. G. Wheeler

on November 11, 1861, in Janesville, Wis. After his graduation from Janesville High School he studied law in the offices of practising attorneys and was subsequently admitted to the bar. He entered railway service on April 1, 1909, when he became Wisconsin attorney for the Chicago & North Western. On January 1, 1912, he was appointed assistant general counsel for the same road, which position he held until August 31 of this year. Mr. Wheeler's headquarters will continue to be in Chicago.

The following have been elected officers of the East & West Coast Railway: Allen W. Jones, president; W. B. Wilson, vice-president; J. L. Strong, auditor; M. A. Clyburn, treasurer, all with headquarters at Bradenton, Fla.

Operating

W. T. Griswold, trainmaster of the Atlanta & St. Andrews Bay, has been appointed superintendent, with headquarters at Panama City, Fla.

Thomas M. Flynn, trainmaster of the Northern Pacific at Forsyth, Mont., has been transferred to Glendive, vice J. J. Sexton, transferred.

John J. Mulroy, chief dispatcher on the Northern Pacific, has been promoted to trainmaster, with headquarters at Jamestown, N. D. Effective September 1.

W. H. Smith has been appointed inspector of transportation of the Nashville, Chattanooga & St. Louis, reporting to E. M. Wrenne, acting superintendent of transportation at Nashville, Tenn.

C. E. Benjamin has been appointed chief train dispatcher of the Buffalo division of the New York, Chicago & St. Louis, with headquarters at Conneaut, Ohio, vice J. T. Callahan. Effective September 1.

Edward J. Moran, chief dispatcher of the Northern Pacific, has been appointed trainmaster, with headquarters at Pasco, Wash., vice Francis M. Smith. Mr. Smith has been transferred to East Grand Forks, Minn., vice F. C. Huntington, promoted. Effective September 1.

M. B. Bayer, assistant superintendent of the Oregon-Washington Railroad & Navigation Company at Tacoma, Wash., has been transferred to Portland, Ore., where he will join the staff of the joint facilities committee which supervises the operation of lines used in common by the O.-W. R. R. & N. and other companies.

F. W. Brown has been appointed assistant to general manager of the Southern Railway, the Virginia & Southwestern and the

Northern Alabama, with headquarters at Washington, D. C., in general charge of train tonnage and efficiency and such other duties as may be assigned to him. William M. Netherland, assistant to general manager, will continue as heretofore in charge of dining car, stores and test departments.

P. J. Flynn, manager of the Winnipeg Union Terminals, has been appointed superintendent for the Canadian Northern at Winnipeg, Man., vice M. B. Murphy, who has been transferred to Calgary, Alta. Mr. Murphy succeeds J. L. Bloomer, who has been transferred to Brandon, Man., vice W. E. Roberts. Mr. Roberts has been transferred to Dauphin, Man., vice J. Irwin, who was transferred to Toronto, Que. H. J. Hunt, trainmaster of the Winnipeg Terminals, succeeds P. J. Flynn as terminals manager.

C. A. Hodgman, whose appointment as superintendent of car service of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., has been announced, entered railway service with the Chicago & North Western at Chicago. In the spring of 1909 he left the Chicago & North Western to go with the Minneapolis & St. Louis. After varied experience as reclaim clerk, chief record clerk and car distributor he was made yard clerk of the Cedar Lake yards at Minneapolis. In 1910 he was appointed traveling car agent, which position he held until July 1, 1913, when he was made chief clerk to the superintendent of car service. In March, 1914, when the office of superintendent of car service was abolished, he was made chief clerk to the general superintendent, in charge of the car service department, from which position he is now promoted.

G. F. Hawks, whose appointment as general manager of the El Paso & Southwestern was announced in these columns on August 27, was born on August 28, 1857, at Kirkland, Ohio. Following his graduation from high school at Rockville, Ind., he entered railway service in August, 1874, as a brakeman on the Logansport, Crawfordsville & Southwestern, now a part of the Vandalia System. Since that time he has held the following positions: brakeman of the Wabash System and other lines until 1878, conductor on the Pekin, Lincoln & Decatur, Chicago, Peoria & Southwestern, Canadian Pacific and Atchison, Topeka & Santa Fe from September, 1878, to May, 1890; trainmaster of the Panhandle and other divisions of the Santa Fe from May, 1890, to March, 1896; train inspector of the Mexican Central from October, 1897, to May, 1898; superintendent of the San Luis division of the same road until November, 1900; from that date until October, 1901, superintendent of the Mexico division; trainmaster of the Texas & New Orleans and Louisiana Western roads of the Southern Pacific System, from November, 1901, to February, 1902; assistant superintendent of the Louisiana lines of the same system from February, 1902, to March, 1903; superintendent of the El Paso division of the Galveston, Harrisburg & San Antonio from March, 1903, to April, 1904; superintendent of the Texas & New Orleans and the Galveston, Houston & Northern from April, 1904, to May, 1905; general superintendent of the Houston & Texas Central, Houston East & West Texas and Houston & Shreveport from May, 1905, to April, 1907; from April, 1907, to September, 1915, general superintendent of the El Paso & Southwestern.

Traffic

Frank Waterhouse has been appointed foreign freight agent of the Union Pacific, with headquarters at Seattle, Wash.

A. A. Boyle has been appointed commercial agent of the Missouri & North Arkansas, with headquarters at Birmingham, Ala.

Charles M. Andrews has been appointed district freight and passenger agent of the Southern Pacific at Seattle, Wash., to succeed Charles G. Chisholm, resigned.

W. H. Leahy has been appointed general freight and passenger agent of the Atlanta & St. Andrews Bay, with headquarters at Panama City, Fla., succeeding L. J. Rowell.

John T. Cummins, advertising agent for the Union Pacific Railroad, at Omaha, has been appointed general advertising agent for the Union Pacific System, and the advertising department of the system has been transferred from Omaha to Chicago. Mr. Cummins assumed his new duties on September 1.

F. S. Davis, chief of the joint tariff bureau of the New York, New Haven & Hartford, the Boston & Maine, the Maine Central, the New England Steamship Company and the Central New England has been appointed general western freight and passenger agent of the New York, New Haven & Hartford, the Central New England and the New England Steamship Company, with headquarters at Pittsburgh, Pa.

W. A. Hopkins, division freight agent of the Wabash at Toledo, Ohio, has been promoted to general live stock agent, with headquarters at St. Louis, succeeding J. L. Harris, resigned to accept service elsewhere. D. E. Gilbert, commercial agent of the same road at Cleveland, Ohio, has been promoted to division freight agent, Toledo, Ohio, vice W. A. Hopkins, promoted. R. A. Brown, traveling freight agent, Buffalo, N. Y., has been promoted to commercial agent, Cleveland, Ohio, succeeding D. E. Gilbert. J. E. Sunderland, traveling freight agent, Springfield, Ill., has been promoted to commercial agent, Peoria, Ill., succeeding James Gouran, deceased.

Edwin S. Stephens, who was appointed general freight agent of the Chicago & Eastern Illinois September 1, was born August 21, 1874, at Kansas City, Mo. He was educated in the public schools and entered railway service in 1892 as a clerk on the Kansas City, Ft. Scott & Memphis. Since that time he has been consecutively timekeeper in the shops of the Atchison, Topeka & Santa Fe, clerk in the auditor's office and stenographer in the transportation department at Albuquerque, N. M., and division clerk and chief clerk at Gallup, N. M., from 1893 to October, 1898; from October, 1898, to January, 1900, he was secretary to the president of the Kansas City, Ft. Scott & Memphis; from January, 1900, to June, 1903, chief clerk of the same office and with the St. Louis & San Francisco at St. Louis, Mo.; from June, 1903, to December 31, 1907, commercial agent of the St. Louis & San Francisco at Kansas City, Mo.; from January 1, 1908, to April 1, 1910, freight claim agent of the Chicago & Eastern Illinois at Chicago; from April 1, 1910, to January 1, 1912, general agent of the same road and the St. Louis & San Francisco at Chicago; from January 1, 1912, to September 1, 1915, assistant general freight agent of the C. & E. I. at Chicago.

Frank E. Webster, whose appointment as assistant general freight agent of the Chicago & Eastern Illinois was recorded in our issue of last week, was born on July 9, 1879, in Charles county, Md. He was educated in the public schools and in 1902 he entered railway service as a file clerk with the Southern Railway at Washington, D. C. In 1903 he went to the Rock Island, where he held the position of revision clerk in the office of the freight department. In 1904 he entered the employ of the Chicago & Eastern Illinois as a rate clerk in the traffic department. From 1905 to 1908 he was chief rate clerk in this department. In April, 1908, he entered the service of the Illinois Traction System as assistant to the general traffic manager. In October, 1909, he re-entered the service of the C. & E. I.-Frisco Rock Island lines as traveling freight agent, with headquarters at Nashville, Tenn. When the Rock Island and Frisco lines were separated, he was transferred to Milwaukee, Wis., and Minneapolis, Minn., as traveling freight agent of the C. & E. I.-Frisco lines. In April, 1910, he was appointed chief clerk in the general freight office of the C. & E. I. at Chicago. In November, 1911, he was appointed chief clerk to the freight traffic manager of the C. & E. I.-St. L. & S. F. at St. Louis, Mo. In December, 1912, he was appointed division freight agent of the C. & E. I. at Salem, Ill. On July 1, 1913, he was promoted to chief of the tariff bureau of the same road at Chicago, Ill., and on September 1, 1915, was promoted to assistant general freight agent, with headquarters in the same place.

Engineering and Rolling Stock

J. C. Gardner has been appointed chief engineer of the East & West Coast, with headquarters at Bradentown, Fla.

R. M. Boldridge has been appointed master mechanic of the Apalachicola Northern, with office at Port St. Joe, Fla., succeeding J. P. Dolan, resigned.

W. H. Owens, master mechanic of the Southern Railway at South Richmond, Va., has been appointed mechanical member of the valuation department of the Southern Railway.

W. D. Pearce, assistant engineer of the Northern Pacific, has been appointed supervisor of bridges and buildings on the

Yellowstone division, with headquarters at Glendive, Mont., vice W. C. Sloan, promoted.

John H. Pontius, general engine inspector of the Pennsylvania Lines West of Pittsburgh at Columbus, Ohio, has retired after 50 years of continuous service with the road.

J. E. O'Brien, assistant mechanical superintendent of the Missouri Pacific and St. Louis, Iron Mountain & Southern, has been appointed mechanical superintendent, with headquarters at St. Louis, vice R. J. Turnbull, resigned. W. C. Smith, general master mechanic of the western district of the Missouri Pacific, with headquarters at Kansas City, Mo., has been appointed to fill the vacancy created by the promotion of Mr. O'Brien.

C. A. Parker, telephone maintainer of the Buffalo, Rochester & Pittsburgh, has been appointed signal supervisor on the Middle and Pittsburgh divisions, with headquarters at Du Bois, Pa., succeeding F. G. Morehart, resigned to go to another company, and J. H. Moore, general signal foreman, has been appointed signal supervisor of the Buffalo division, with headquarters at East Salamanca, N. Y. The office of general signal foreman has been discontinued.

William C. Smith, who was appointed assistant mechanical superintendent of the Missouri Pacific-St. Louis, Iron Mountain & Southern on September 1, was born on September 25, 1869, in Michigan. He was educated in the common schools and entered railway service on December 7, 1887. From that time until April, 1895, he served as machinist apprentice and machinist on the Missouri Pacific Railway; from April to November, 1895, he was a machinist on the Atchison, Topeka & Santa Fe; from November, 1895, to January, 1897, he was gang foreman on the Missouri Pacific at Kansas City, Mo.; from January, 1897, to January, 1902, machinist and shop foreman at Osawatomie, Kan.; January, 1902, to January, 1905, division foreman at Hoisington, Kan.; January, 1905, to February, 1906, master mechanic at Ft. Scott, Kan.; February, 1906, to July, 1912, master mechanic at Kansas City, Mo.; July 1, 1912, to September, 1915, general master mechanic of the Western division of the same road.

J. E. O'Brien, who has been appointed mechanical superintendent of the Missouri Pacific-St. Louis, Iron Mountain & Southern, was born on December 4, 1876, at Stillwater, Minn. He completed his education at the University of Minnesota in 1898 and in the same year entered railway service as special apprentice with the Northern Pacific at Livingston, Mont. From November 1, 1901, to November 25, 1903, he had charge of the general inspection of material and tests at St. Paul, Minn. From that time until December 1, 1904, he served as master mechanic of the Dakota division at Jamestown, N. D., following which he held the position of assistant shop superintendent at South Tacoma, Wash. From August 1, 1909, to January 1, 1910, he was mechanical engineer of the same road at St. Paul, Minn. On January 1, 1910, he became superintendent of motive power for the Western Pacific at San Francisco, Cal., and held this position until October 8, 1913, when he was appointed assistant mechanical superintendent of the Missouri Pacific, with headquarters at St. Louis, Mo. In his new capacity as mechanical superintendent Mr. O'Brien will remain in St. Louis.

Julius Edgar Willoughby, assistant chief engineer of the Atlantic Coast Line, has been appointed chief engineer, with headquarters at Wilmington, N. C., succeeding E. B. Pleasants, deceased. Mr. Willoughby was born on October 12, 1871, at Arkadelphia, Ala., and was educated at the University of Alabama. In 1887 he began railway work as a rodman on surveys on the Louisville & Nashville. From 1892 to 1899 he filled subordinate positions in the land and engineering departments of the same road. In 1900 he was promoted to assistant chief engineer of construction for the lines in Alabama, and the following year became engineer of construction of the Alabama & Florida, now a part of the Louisville & Nashville. In 1902 he was appointed division engineer of the Knoxville, La Follette & Jellico, now a part of the Louisville & Nashville, and from 1902 to 1904 he served as chief engineer of the same road. From 1905 to 1912 he was engineer of construction of the Louisville & Nashville system, also chief engineer of several of the Louisville & Nashville subsidiary lines. He then served as chief engineer of the National Railroad of Haiti, and of the Caribbean Construction Company, engaged in the development of the Island of Haiti, until 1913, when he entered the service of the Atlantic Coast

Line as assistant chief engineer, which position he held at the time of his recent appointment as chief engineer of the same road.

OBITUARY

Frederick M. Spaidal, general superintendent of the Canadian Northern Quebec, died on September 2 at Montreal, Que.

F. A. Durban, of Zanesville, Ohio, general attorney of the Baltimore & Ohio for the states of Ohio and Indiana, died on Tuesday night of this week on a train near Cumberland, Md., while on his way home from the East. He was sixty years old.

Edward B. Pleasants, chief engineer of the Atlantic Coast Line, with headquarters at Wilmington, N. C., who died suddenly on his private car in Washington, D. C., on August 22, at the age of 65, as has already been mentioned in these columns, was born on August 2, 1850, in Richmond, Va. At an early age he entered the service of the United States Coast Survey, and remained in that service for five years, attaining the rank of assistant engineer. He began railway work as an assistant engineer on the Baltimore & Ohio, remaining with that road for two years. In 1878, he went to the Baltimore & Lehigh, now a part of the Pennsylvania system, as assistant engineer, and afterwards became chief engineer of the same road. During 1886 and 1887 he was engineer in charge of construction of a railway in Maryland. He then went to the Norfolk & Carolina, now a part of the Atlantic Coast Line, and since 1902 was chief engineer of the Atlantic Coast Line system.

E. F. McCrea, division engineer of the Pennsylvania Lines, died on August 28, near Logansport, Ind. He was born in that city on November 7, 1880. He entered the service of the Pennsylvania Lines in 1899 on the Grand Rapids and Indiana division; in 1901 he was transferred to the Cleveland and Pittsburgh division at Wellsville, Ohio. In 1904 he was appointed assistant division engineer at Richmond, Ind., and from September, 1905, to July, 1908, served as assistant engineer of the C. and P. division. From 1908 until February, 1911, he was assistant engineer on the Pittsburgh division; from the latter date until February, 1912, he was division engineer on the Zanesville division; from February, 1912, to November, 1912, he served in the same capacity on the Toledo division, and from that date until January, 1913, on the Cincinnati division. From 1913 until his death he was division engineer on the C. and P. division at Cleveland.

FINNISH RAILWAYS.—At the beginning of 1914 the total mileage of the Finnish State Railways, including 207 miles of line owned by private capital, but operated by the state lines, was 2,537. Finland has 2,765 miles of navigable waterways, of which, with the present facilities, it is estimated that the freight capacity is about 1,600,000 tons a year. The waterways as well as the railways are under the administration of the state.

NEW RAILWAY LINES IN BOLIVIA.—The line from Uyuni, Bolivia, a station on the Antofagasta & Bolivia Railroad, which has been under construction in a southeasterly direction towards Tupiza, is to be extended, it is said, to the present northern terminus of the Argentine railways at La Quiaca, a point on the frontier directly south of Tupiza. The completion of the line from Uyuni to Tupiza and the construction of a line between Tupiza and La Quiaca will provide a new through rail route from the Atlantic ocean to the Pacific.

RAILROAD CONSTRUCTION IN NORTHERN CHILE.—Construction work on the Longitudinal Railway has been completed and the line is now in operation as far north as Pintados, Chile. The construction of a connecting line to connect the main line with an ocean port at Iquique was started, but work has been stopped on account of exhaustion of funds appropriated for that purpose. The government proposes to spend \$134,000 to continue this work during the coming year. The completion of the line to Iquique will open up for development some nitrate land and other mineral deposits. The construction of the proposed line to connect the Longitudinal Railway with the ports of Antofagasta and Mejillones has been postponed. This branch, which was to start from the main line at Baquedano Station, will probably be built when financial conditions improve.

Equipment and Supplies

LOCOMOTIVE BUILDING

THE NORFOLK & WESTERN is inquiring for prices on 30 Mallet type locomotives.

THE ILLINOIS CENTRAL is inquiring for prices on 50 Mikado type locomotives.

THE CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA has ordered four Pacific and six Mikado type locomotives from the American Locomotive Company.

THE TEXAS & PACIFIC, which has been in the market for 10 switching, six passenger and six freight locomotives, has ordered a number of locomotives from the Baldwin Locomotive Works.

THE CHICAGO & NORTH WESTERN is reported to have ordered 12 Pacific type, 12 Mikado type, 10 switching and one narrow gage locomotives from the American Locomotive Company. This item has not been confirmed.

THE MADRID, SARAGOSSA & ALICANTE RAILWAY of Spain has ordered 25 12-wheel (4-8-0) locomotives from the American Locomotive Company. These locomotives will have 63-in. driving wheels, 16.53-in. and 25.2-in. by 25.6-in. cylinders and a total weight of 193,000 lb.

CAR BUILDING

THE COPPER RIVER & NORTHWESTERN is inquiring for prices on 50 freight cars.

THE BALTIMORE & OHIO has ordered 200 car bodies from the Greenville Steel Car Company.

THE BOSTON & MAINE is inquiring for six coaches, two smoking cars and six baggage cars.

THE ATCHISON, TOPEKA & SANTA FE has ordered 500 stock cars from the Pullman Company.

THE WHEELING & LAKE ERIE is inquiring for 650 70-ton steel gondola cars and 200 40-ton automobile cars.

THE CHICAGO & NORTH WESTERN has ordered 100 refrigerator cars from the Haskell & Barker Car Company.

THE PENNSYLVANIA LINES WEST have ordered underframes for 200 caboose cars from the Haskell & Barker Car Company.

THE BANGOR & AROOSTOOK has ordered 100 80,000-lb. capacity steel underframe flat cars from the Standard Steel Car Company for delivery in November or December.

THE ATLANTIC COAST LINE has ordered one combination passenger and baggage car, three combination baggage and mail cars and two coaches from the Pullman Company.

THE LAKE SUPERIOR & ISHPEMING was reported in the *Railway Age Gazette* of June 25 as having ordered 400 ore cars from the Cambria Steel Company. These cars are center dump ore cars. They were ordered from the Clark Car Company, Pittsburgh, Pa., and are being built by the Cambria Steel Company.

THE INTERBOROUGH RAPID TRANSIT has been authorized by the New York Public Service Commission, First district, to use on its elevated lines the 478 composite car bodies ordered by the commission to be withdrawn from service in the subway. The car bodies with new trucks and electrical equipment will be placed in service on the Second and Third avenue lines of the elevated system, now being third-tracked and reinforced.

IRON AND STEEL

THE LOUISVILLE & NASHVILLE is reported to have ordered 43,000 tons of rails from the United States Steel Corporation.

THE NORFOLK & WESTERN has ordered a quantity of structural steel from the Virginia Bridge & Iron Company for an addition to a framing shop at Roanoke, Va.

THE PENNSYLVANIA has ordered 500 tons of bridge steel from the American Bridge Company and 100 tons from the

Eastern Steel Company. This road has also ordered 350 tons of steel for an immigrant pier at Philadelphia from the Jones & Laughlin Steel Company.

MACHINERY AND TOOLS

THE PENNSYLVANIA RAILROAD has awarded a contract to the Mead-Morrison Company, Boston, Mass., for the installation of a car dumper at Baltimore.

THE SEABOARD AIR LINE has placed orders for from 75 to 100 machine tools to be installed in the company's shops at Jacksonville, Fla., and Portsmouth, Va.

SIGNALING

THE WESTERN MARYLAND has contracted for 67 miles of single-track automatic signaling, with the Union Switch & Signal Company, in addition to the 80-mile contract mentioned in the *Railway Age Gazette* of July 30. The new installation will cover the section between Colmar, Pa., and Connellsville. This work will complete all the single-track signaling on the main line of this road between Baltimore, Md., and Connellsville, Pa.

THE PENNSYLVANIA is to put up position-light signals on the Allegheny division, to be of the same type as those between Philadelphia and Paoli, but of different form. The signals of the position-light type will be installed at the entrances of a single-track tunnel. These signals will operate in the horizontal and 90-deg. positions, with a preliminary setting section of about 2,000 ft. The lights will be normally out and will be lighted when a train enters the preliminary setting section.

THE PENNSYLVANIA will install a 24-lever electro-mechanical interlocking machine at North Eddystone, on the Maryland division. The machine will be of the General Railway Signal Company's type. The signals will be electro-pneumatic, conforming to the type of automatic signals now in service in this territory. A 16-lever G. R. S. electro-mechanical machine will also be installed at the new interlocking at Franktown, on the Middle division. The signals at this plant will be electric motor-operated.

THE BALTIMORE & OHIO has just completed an extension of automatic signals between Weverton, Md., and Engle, W. Va., six miles, together with the necessary rearrangements of interlocking plants at Weverton, Harper's Ferry and Engle. At Harper's Ferry and Engle, power signals were substituted for the mechanical signals, with provision both for unlimited and for restricted speeds. Automatic signals (allowing permissive movements) are used to facilitate the movement of freight trains westbound. The extension of automatic signals west from Engle to Cumbo, a distance of 20.1 miles, is contemplated in the near future.

THE UNION TERMINAL COMPANY of Dallas, Tex., has contracted with the Union Switch & Signal Company for electro-pneumatic interlocking for the new union passenger station in that city. This station is a joint project of the Missouri, Kansas & Texas, the Texas & Pacific, the Houston & Texas Central, the Gulf, Colorado & Santa Fe, the Trinity & Brazos Valley, the St. Louis, San Francisco & Texas, the Chicago, Rock Island & Gulf and the St. Louis Southwestern. The Texas & New Orleans will use the new station as a tenant of the Houston & Texas Central. The station is of the through type, with the various lines diverging both north and south of the station, known respectively as North and South Junction. The machine at North Junction will have 82 working levers and 21 spare spaces, and the one at South Junction 53 working levers and 18 spare spaces. Lever light indicators will be furnished for all working switch levers. Alternating-current track circuits will be installed with Union model 15 vane relays.

WAR STOCKS IN MANCHURIA.—A consular report says that the South Manchuria Railway shops at Shohoku now undertake all kinds of work in metals, even the manufacture of munitions of war and of locomotives.

A WHALE CAR.—An English concern is building some cars for the South African Railways. One of these cars is designed to transport a whole whale just as it is caught. The concern is also building 500 fifty-ton box cars for 3 ft. 6 in. gage.

Supply Trade News

The Pressed Steel Car Company is reported to have secured a large order for shells.

The Edison Storage Battery Company, Orange, N. J., has removed its Cleveland office to the David Whitney building, Detroit, Mich.

E. D. Graff, for several years in the sales department of the Pittsburgh office of Joseph T. Ryerson & Sons, has been transferred to the sales department of the Chicago office.

The American Steel Foundries has reopened its plant at Granite City, Ill., which has been closed for the greater part of the year. Although only a portion of the plant will be utilized, it will be operated entirely on domestic orders.

Milliken Brothers, Inc., has removed its executive and general offices from the Whitehall building, New York City, to its plant at Milliken, Staten Island, and has also removed its sales office from the same building to the Trinity building.

Dr. N. Tucker, the founder of the company's business, has been elected president of the Hydraulic Press Manufacturing Company, Mount Gilead, Ohio, succeeding M. Burr Talmage. Other officers elected at the recent meeting of the board of directors are W. G. Beebe, vice-president, and M. W. Spear, treasurer.

The New York Air Brake Company was reported in the *Railway Age Gazette* of July 16 as having been awarded a medal of honor for its exhibit at the Panama-Pacific International Exposition. By a more recent decision of the superior jury of awards, the final official authority, the company has been awarded a grand prize, the highest award, for its "PS" electro-pneumatic equipment.

H. M. Roberts, until recently railroad representative of the General Lead Battery Company, has been appointed sales engineer of the railroad department of the Edison Storage Battery Company, Orange, N. J. Mr. Roberts graduated in 1905 from the Sheffield Scientific School with the degree of electrical engineer, and for six years was connected with the engineering department of the New York Telephone Company in power-plant work. He later spent several years in general contracting engineering on railroad and other large enterprises with James Stewart & Co., Inc., New York.

J. A. L. Waddell, consulting engineer, Kansas City, Mo., announces that his son, N. Everett Waddell, C. E., has recently become his partner under the firm name of Waddell & Son, with office at 800 Graphic Arts building, Kansas City, Mo. Robert C. Barnett will be connected with the firm as associate engineer and Shortridge Hardesty as assistant engineer. As in the previous years of Dr. Waddell's practice the field of activity will be mainly bridgework of all kinds and its allied branches of construction, but attention will be given also to the making of technical investigations and the solution of problems in engineering economics and to the preparation of reports and estimates on railroads and large engineering projects in various lines in the United States and foreign countries. J. A. L. Waddell was associated with the firm of Waddell & Harrington, consulting engineers, until it was dissolved on July 14, 1915.

The Railway Periodicals Company, Inc., has been incorporated under the laws of New York state and will henceforth publish the *Railway Master Mechanic*, *Railway Engineering and Maintenance of Way* and the *Monthly Official Railway List*, these papers having formerly been published by the *Railway List Company*, Chicago. The officers of the new company are as follows: Ernest C. Brown, publisher of *Gas Age*, president; Charles S. Meyers, vice-president and general manager, and S. A. Bates, secretary-treasurer. Benjamin Norton, at one time president of the Toledo, St. Louis & Western, has been made editor-in-chief, George S. Hodgins, managing editor, and Laurence A. Horswell, associate editor. The *Railway Periodicals Company, Inc.*, will have offices in the Vanderbilt Concourse building, New York, and that will be the office of publication.

Steel Corporation Given 46 Awards

The superior jury of awards of the Panama-Pacific International Exposition has made 46 awards to the United States Steel Corporation and its subsidiary companies for the elaborate exhibit at San Francisco. Included in the total there are a special gold medal for the "best, most complete and most attractive installation," 11 grand prizes, 10 medals of honor, one gold medal of honor, 20 gold medals and three silver medals.

Grand prizes (the highest possible regular awards) were awarded to the Steel corporation itself for its "comprehensive, educational exhibit of the steel industry and related industries" and to its bureau of safety, sanitation and welfare.

Grand prizes were also awarded to the following companies for the excellence of their exhibits, the greatest merit being recognized in certain of the products, some of which are named herein, as representing the highest development of the art: Carnegie Steel Company, armor plate, special alloy steels, railway wheels and axles, steel sheet piling, rail joints, etc.; Illinois Steel Company, ferro-silicon, electric carbon and alloy steels, railroad track specialties, axles, etc.; the Tennessee Coal, Iron & Railroad Company; the Lorain Steel Company, tadpole tongue switch, tongue-holding device and electrically welded rail joints; the American Bridge Company, sections of building columns, section of Hell Gate bridge chord, steel barges, standard railroad turntable, etc.; the American Sheet & Tin Plate Company; the American Steel & Wire Company, wire rope, wires, copper rail bonds, insulated copper wires and cables, etc.; the National Tube Company, National steel pipe and tubing, National protective coating, National Kewanee unions, valves and fittings and Shelby seamless steel tubing, and to the Universal Portland Cement Company.

Medals of honor were awarded the United States Steel Products Company, export department; the Oliver Iron Mining Company; the Pittsburgh Steamship Company; the Pittsburgh & Conneaut Dock Company; the H. C. Frick Coke Company; the Duluth, Missabe & Northern, and also to the Steel Corporation, the Carnegie Steel Company and the Illinois Steel Company.

Gold medals were awarded the Bessemer & Lake Erie, the Birmingham Southern, the Duluth & Iron Range, the Elgin, Joliet & Eastern, the Newburgh & South Shore and the Union Railroad for pictorial exhibits of typical roadbed, shops, yards, bridges, buildings and freight and passenger equipment employed in operation.

Gold and silver medals were also given to a number of the officers and employees of the various companies for their success in planning the respective exhibits.

TRADE PUBLICATIONS

WATER TUBE BOILERS.—The A. D. Granger Company, New York, has just published bulletin No. 2, sixth edition, describing its Oswego internally fired water-tube boiler. The bulletin, which is well illustrated, describes the latest improved features of this self-contained internally fired water-tube boiler. Dimensions, ratings and other data are given for both high-pressure and low-pressure boilers, and pictures of the detailed parts of the Vulcan shaking grates are shown.

RAIL REPORTS.—The Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., has issued Bulletin No. 8 of its series of rail reports. This bulletin contains detailed comparative data regarding 111 standard and 101 Titanium treated open-hearth A-rails with from 8 to 10 per cent discard and rolled by seven different manufacturers in the United States and Canada. Samples for the determination of carbon were selected from the points in the head specified in the revised specifications of the Pennsylvania, and the average difference in carbon between the required points for the standard open-hearth rails is shown as 17.2 per cent, as compared with 4.2 per cent for the Titanium treated rails. Sulphur prints of these various specifications are also shown with data regarding the individual sections. Based on formulae for tensile strength and elongation developed by M. H. Wickhorst in Bulletin 170 of the American Railway Engineering Association, dated October, 1914, detailed comparisons are made for standard and Titanium treated open-hearth rails with a revised formula showing similar improvement in physical properties for the Titanium treated rails.

Railway Construction

ATLANTA & ST. ANDREWS BAY.—This road has been extended from Panama City, Fla., to St. Andrews, two miles.

ALABAMA ROADS (ELECTRIC).—Plans are being made to build an electric line, it is said, from Jasper, Ala., southeast via Ensley, to Birmingham, about 35 miles. L. B. Musgrove and associates, Jasper, Ala., are back of the project.

CHESTER & CITY POINT (Electric).—Incorporated in Virginia with \$100,000 capital to build an electric line from Chester, Va., southeast to City Point and to Hopewell, crossing the Appomattox river at or near Point of Rocks. Preliminary surveys have been made and the company expects to have the line completed by next spring. H. D. Eichelberger, president, Richmond, Va., and Chester.

CLINTON & OKLAHOMA WESTERN.—Surveys have been made, it is said, for an extension to be built into the Panhandle of Texas, and surveys are to be made for an extension from Clinton, Okla., southeast to Chickasha, about 75 miles. The company now operates a 51-mile line from Clinton west to Strong City.

COLUMBIA, NEWBERRY & LAURENS.—Plans are being made to build a 65-mile branch, it is said, from Newberry, S. C., south via Saluda and Edgefield to Augusta, Ga. The company now operates a 75-mile line from Columbia west via Newberry to Laurens.

ELECTRIC SHORT LINE.—A contract has been given to H. F. Balch & Co., Minneapolis, Minn., it is said, to build an extension of about 45 miles from Winsted, Minn., west via Silver Lake and Hutchinson. (Jan. 22, p. 171.)

ETTRICK & NORTHERN.—The Railroad Commission of Wisconsin has granted permission to this company, it is said, to build a line from a connection with the Green Bay & Western south-east through the towns of Ettrick and Preston, Wis. J. C. Gaveney, president, Arcadia.

OIL FIELDS & SANTA FE.—This line has been completed from Jennings, Okla., to Oilton, Creek county, and from Cushing to Pemeta and Drumright, and at the present time is being built from Pemeta to Oilton.

OKLAHOMA UNION TRACTION.—See Tulsa Traction Company.

OREGON-WASHINGTON RAILWAY & NAVIGATION COMPANY.—This company has begun the construction of seven miles of railroad from Olympia, Wash., to Plum station, where it will connect with the water-grade line of the Northern Pacific. Grading was completed some time ago, and two tunnels are now in the process of construction. The new road already owns half a block in Olympia, which will be used for terminal facilities.

PENNSYLVANIA RAILROAD.—An officer writes that the company recently began work on a 3.5-mile extension of the Yellow Creek branch of the Pennsylvania Railroad from Homer, Pa., to the mines of the Sterling Coal Company. The contract for this work was awarded over a year ago.

SALINA NORTHERN.—This road has been opened for business from Salina, Kan., northwest to Lincoln Center, 35 miles, and is under construction on an extension to Corinth and Downs, 43 miles, also on a branch from Corinth to Osborne, 10 miles.

TEXAS ROADS.—Financial arrangements have been made, it is said, for building the line from Lamesa, Texas, south to Midland, or to some other point on the Texas & Pacific, about 55 miles. Miles Westbrook, Dallas, and T. J. O'Donnell, Sweetwater, are interested. (May 7, p. 993.)

TULSA TRACTION COMPANY.—This company was recently incorporated in Oklahoma with \$100,000 capital and plans to build from Tulsa, Okla., southwest to Sapulpa, also extensions connecting Broken Arrow, Bixby and Okmulgee and a line north to Collinsville, in all about 80 miles. The company has bought the Oklahoma Union Traction line in Tulsa. G. C. Stebbins, president; A. J. Biddison, vice-president and general counsel; I. F. Crow, secretary and treasurer, Tulsa, and B. C. Redgraves, superintendent.

RAILWAY STRUCTURES

BUREAU, ILL.—Bids have been let for the construction of a bridge for the Chicago, Ottawa & Peoria over Bureau creek to consist of five spans 34 ft. 8 in. long, with deck-plate girders designed for Cooper's E-40 loading. The cost will be approximately \$6,000.

CHICAGO, ILL.—The Chicago & Northwestern will soon build a grain elevator on the Indiana Harbor Belt in the Calumet district which will have a capacity of 2,500,000 bushels and will cost approximately \$2,000,000. It was the original purpose of the company to begin the erection of the elevator last spring, but the project was subsequently postponed.

Cravens, Tenn.—The entire mechanical plant of the Nashville, Chattanooga & St. Louis has been transferred from Chattanooga, Tenn., to Cravens yards, about four miles from Chattanooga. Additional tracks have been laid at Cravens, also a three-story stucco office building, sand houses and oil houses, and a 90-ft. turn table with concrete base, operated by electric tractor. The plans contemplate the erection of car repairing sheds, also the construction of an incline to permit the transfer of freight to and from the river.

Greenville, N. J.—The Pennsylvania Railroad asked for bids on September 8 for the construction of a new pier to be built at Greenville.

LA SALLE, ILL.—The Chicago, Ottawa & Peoria has let the contract for a bridge over the Vermillion river to the Joliet Bridge & Iron Company. The structure will consist of two 26-ft. spans, with deck-plate girders designed for Cooper's E-40 loading. The total estimated cost is \$3,800.

McAllen, Tex.—Engineers for the St. Louis, Brownsville & Mexico are laying off the grounds for a new brick depot at McAllen, the estimated cost of which is \$7,000.

Manchester, N. H.—Plans are being made for building a new bridge at South Elm street in Manchester, to cost about \$76,000. The city of Manchester will pay \$40,000, the Boston & Maine \$24,000, and the Manchester Street Railway \$12,000 of the cost of the structure.

NEW YORK.—The New York Public Service Commission, First district, has awarded the contract for station finish on the Jerome avenue and White Plains avenue rapid transit lines, in the borough of the Bronx, to the Altoria Realty & Construction Company, the lowest bidder, for \$860,363. (September 3, p. 449.)

SPARTANBURG, S. C.—The Southern Railway has given a contract to J. P. Pettyjohn & Co., Lynchburg, Va., for the construction of new freight station facilities at Spartanburg, to consist of a one-story in-bound freight house 40 ft. by 250 ft., with two-story office section. The building is to be constructed of brick with concrete floor and fireproof roof and is to be equipped with rolling steel doors. There will also be a modern one-story out-bound freight house 22 ft. by 250 ft., with concrete floor and base, frame construction and fireproof roof. The terminal will also include four house tracks, with a capacity of 32 cars, and four team tracks, with a capacity of 29 cars. A 20-ton Pillar crane will also be provided for the handling of heavy freight. Work on these improvements will be started as soon as the necessary material can be assembled and will be rushed to completion.

Vancouver, B. C.—An officer of the Canadian Northern is quoted as saying that work will be started soon on a terminal in Vancouver for the Canadian Northern.

COMMODITIES CARRIED ON THE MANCHURIAN RAILWAYS.—Coal furnishes the greatest tonnage of any commodity carried by the railways from Manchuria into Kwantung. Next to this come beans, of which there was 637,612 tons carried in 1914, and in addition 67,027 tons of bean cakes. There was also 62 tons of bean sauce carried, while on the other hand there was only 3,611 tons of timber and wood of all kinds carried.

EXPRESS IN RUSSIA.—The European representative of an American Express company is now in Petrograd, Russia, investigating the advisability of establishing a branch office there with agencies in other parts of Russia.

Railway Financial News

BOSTON & MAINE.—Of the holders of \$17,083,000 extended notes of the Boston & Maine, which matured September 2, all except the holders of about \$400,000 have agreed to postpone any cash payment until March 2. About \$150,000 of these non-assenting notes are held in Great Britain and are therefore affected by the British treasury's rulings.

CHICAGO, ROCK ISLAND & PACIFIC.—Arthur Curtiss James and James McLean, both representing Phelps, Dodge & Co., New York, interests, have resigned from the board of directors of the Chicago, Rock Island & Pacific. Both Mr. McLean and Mr. James endorsed the note which the Chicago, Rock Island & Pacific gave to the Bankers' Trust Company on March 31 for \$1,600,000, which note falls due October 1.

FT. SMITH & WESTERN.—This company has made an agreement with the Missouri, Kansas & Texas whereby it uses the M., K. & T. tracks from Fallis, Okla., to Oklahoma City, 32 miles.

WABASH-PITTSBURG TERMINAL.—The following statement has been issued by the reorganization committee of the Wabash-Pittsburg Terminal:

"On August 24 the court at Pittsburgh made an order authorizing H. F. Baker, the receiver of the Wabash-Pittsburg, to enter into a contract with the Pennsylvania road for the construction of the so-called Bridgeville connection.

"This marks a long step forward in the rehabilitation of the terminal properties. The importance of the Bridgeville connection lies in the fact that it gives to the Terminal company a direct outlet over the lines of the Pennsylvania and permits a direct interchange of traffic with that company. The Terminal company is thus enabled to reach a territory extending from the Atlantic seaboard to the Middle West over the lines of the Pennsylvania that have for a number of years been closed to it.

"Pursuant to the authority granted by the court, the receiver has signed the agreement, and construction of the connection has already been commenced and is progressing. It will be about October 1 when the interchange of business will commence.

"The incalculable benefit to the Terminal company of this connection can best be judged by the history of the Wabash-Pittsburg Terminal on this particular point. The Terminal was a prosperous property, enjoying this connection at the time when Mr. Gould and Mr. Cassatt, the latter representing the Pennsylvania road, became estranged. The Goulds controlled the Terminal property. By reason of this dispute the Pennsylvania terminated its traffic relations with the Terminal road and the latter since that time has suffered accordingly. This renewal of traffic relations will be to the great benefit of the Wabash-Pittsburg Terminal, and it is expected will be very profitable, as it opens up an avenue of business that has been closed since the break with the Goulds."

JAPANESE RAILWAY DEVELOPMENT.—The English commercial attache at Yokohama reports that of the Imperial Government railways about 175 miles of new sections and about 150 miles of light railways were open to traffic during 1914. The most important sections were 25 miles on the Tokushima line, 23 miles on the Sakata line and 20 miles each on the Murakami and Gwanyetsu lines. Two of the most interesting events of the year were the completion of the splendid new central station in Tokyo, and the opening of the new government electric railway between Tokyo and Yokohama. This railway, which runs side by side with the existing steam track, is 19 miles long and connects the two above-mentioned towns. Between the two termini there are 14 intermediate stations. Unfortunately, the railway had only been in operation for a few days at the end of the year when it became necessary for the authorities to discontinue the service. As far as it is possible to ascertain, the whole of the trouble lay with the overhead equipment, which at the time of opening to public service was in an unfinished state, so that trial running of the trains was only carried out for about two days.